2019 Connecticut Work Zone Reviews Annual Report



State of Connecticut Department of Transportation Office of Construction

Prepared by
Anthony O. Kwentoh, P.E.
Kiah A. Patten

Reviewed by
James P. Connery, P.E.

Construction Division Chief

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* Individual Review Reports can be obtained by sending a request to the Office of Construction's Work Zone Safety Team.

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- 2. 0014-0185 Bridge Rehabilitation over I-95 and U.S. 1, Branford (\$11,370,456.82)
- 3. 0063-0708 Bridge Rehabilitation on I-84/Sisson Avenue Interchange, Hartford (\$19,426,455.36)
- 4. 0118-0169 Bridge Replacement on Route 160 over I-91, Rocky Hill (\$11,550,297.75)
- 5. 0135-0301 Replacement of MNRR Bridge over Atlantic Street, Stamford (\$76,373,563.84)
- 6. 0135-0325 Bridge Rehabilitation on U.S. 1 over I-95, Stamford (\$15,347,538.76)
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- 9. 0156-0180 Pavement Preservation on I-95, West Haven (\$7,295,388.45)
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- 1. 0063-0703/0159-0191 Relocation of I-91 Northbound Interchange 29, Hartford, Wethersfield (\$212,964,746.16)
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- 1. 0170-3546 Resurfacing on I-91, Windsor, Windsor Locks, East Windsor (\$10,676,876.56)
- 2. 0172-0482 Ultra-Thin on Route 349, Essex, Deep River, Chester, Colchester, Waterford, Montville (\$14,167,930.00)
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Introduction

The Connecticut Department of Transportation (CTDOT) Office of Construction (OOC) conducts work zone safety field reviews in compliance with 23 CFR 630 Subpart J to evaluate the effectiveness of work zone safety and mobility practices and procedures in the field. The reviews were conducted for randomly selected active highway construction and maintenance projects administered by CTDOT.

During the field reviews, the review team inspects the quality of traffic control devices, construction sign pattern installation and removal, sign visibility and recognition, and opportunities to enhance safety for motorists and road workers. A work zone safety pre-meeting is held where a questionnaire can be completed to determine best practices and opportunities for improvement in the work zone procedures. The focus areas that are inspected include temporary lane closure, temporary signalization, pedestrian/bicycle access, stage construction, detour, and night work. There is also an overarching goal to determine if the findings are the results of potential systemic issues.

During a regular field review, personnel from the OOC, the Office of Maintenance (Maintenance), and the Division of Traffic Engineering (Traffic) are accompanied by the project staff from the District to tour the project's work zone. The review team evaluates what is being implemented and uses best practices and lessons learned as a teaching tool for the project staff, as well as, other Construction inspection staff in subsequent training sessions. The OOC has set a goal to conduct a minimum of ten (10) regular field reviews a year.

For in-depth reviews, the review team may include personnel from the OOC, Traffic, and Federal Highway Administration (FHWA). The team will tour the work zone with the project staff to review what is being implemented and note FHWA's point of view to incorporate federal standards in the findings. The OOC has set a goal to conduct four (4) in-depth field reviews a year.

For both types of review, reports noting findings with corresponding recommendations for improvements and/or best practices, photographs of field conditions, and answers to the questionnaire are compiled and then one comprehensive report is distributed to all participants. The reports either help identify issues that need immediate action, identify possible systemic issues that need addressing on a statewide level, or find the best practices that could improve Connecticut's Work Zone Safety practices.

For the 2019 construction season, the OOC completed ten (10) regular reviews, four (4) in-depth reviews, three (3) pavement preservation reviews, and three (3) Vendor-in-Place reviews. The findings from these reviews were compiled and sorted by similarities. These findings were categorized by the following:

- ADA Issues
- Best Practices
- Clear Zone Interference
- Enforcement of Contract
- Enforcement of Plans
- Lighting Issues
- Message Confusion
- Message Visibility
- More Signage Needed
- Oversize/Overweight Accommodations
- Pavement Marking Issues
- Personal Protective Equipment
- Public Info/Public Outreach Efforts
- Proper Traffic Control Equipment
- Proper Use of Devices
- Protection of the Work Zone
- Quality of Devices
- Queue Length
- Rolling Road Block
- Stakeholder Communication
- Trafficperson Issues
- Transportation Management Plan

Findings from the work zone field reviews will be added to the action item list of the Work Zone Safety and Mobility Process Review for resolution by the appropriate Department unit. The Process Review is an evaluation tool used for the Department's work zone program. The Process Review team is comprised of personnel from the OOC, Traffic, Maintenance, Office of Policy and Planning, and FHWA. Opportunities for improvement, successful practices, and implementation of new technologies can be efficiently proposed and managed between these units to develop a holistic work zone safety program the Department can benefit from.

Summary of Findings and Recommendations

PROJECT NO.	FINDINGS	RECOMMENDATIONS
	ADA Issues	
0135-0301	Along pedestrian paths where hazards are coned or drummed off.	A detectable edge that could be followed by visually impaired pedestrians with a cane should be provided.
	Best Practices	
0135-0325	Two weekend closures of I-95 NB & SB for Acceleration Bridge Construction was very successful.	This ABC project is being recommended for the Lessons Learned and Best Practices presentation at the 2020 Summit.
0140-0172	Project is using steel barrier in lieu of temporary precast concrete barrier curbs as a substitution.	Project team has recommended the steel barrier to be more cost effective and easily movable for placement and relocation.
0172-0446	The RRB operation for installation of the traffic pattern was done well and in the allowable time.	This is a good practice.
0174-0430 A	Since Town Police couldn't fill the law enforcement request, the Contractor is using uniformed flaggers.	With the shortage of police, it is acceptable to use uniformed flaggers and crash trucks for extra protection to set up work zone.
0174-0430 A	The flaggers are using lighted wands to direct traffic.	During night operations, using lighted wands is a good practice.
	Clear Zone Interferen	nce
0014-0185	Drainage vaults are too close to the edge of pavement on Route 1.	The Review Team recommended to install three sand barrels in front of the vaults to protect motorists from the blunt ends.
	Enforcement of Contr	act
0063-0708	The contract contains restrictions to parking spaces that can be impacted for Lot B (Laurel Street) and Lot C (Forest Avenue). No more than 159 spaces can be impacted between the two lots.	Compliance with contract requirements must be adhered to.
0151- 0326/0312/0313	Closed two right lanes in a three-lane section of I-84 WB.	Two lanes are not permitted to be closed until the allowable time in the Limit of Operations.
0156-0180	Contractor placed "Two Left Lanes Closed" sign at 7:00 Pm when only 1 lane was taken.	It is recommended that contractor place the signs at the appropriate time to avoid misleading the traveling public.
	Enforcement of Plan	
0004-0116/0118	Missing FINES DOUBLED signs.	All signs according to the traffic plans need to be installed.

PROJECT NO.	FINDINGS	RECOMMENDATIONS
0004-0116/0118	Type III barricades used to close Old Farms Road has the wrong direction chevrons on them. They are pointing to the left, which is the closed side. They need to be pointing to the right, which is the open side.	Chevrons indicate where the traffic can go. Barricade chevrons need to be pointing down to the side that is open so motorists will proceed to the open travel lane.
0102-0348	The Road Work Ahead Fines Doubled sign is too close to the Right Lane Closed Ahead sign.	It is recommended to place advance warning signs in its appropriate distance in accordance with the standard traffic plans in the contract.
0102-0348	The Right Lane Closed symbol (chimney) sign installed on the left side of the road was installed beyond the taper and not adjacent to the corresponding sign installed on the right side of the road.	It is recommended to place advance warning signs in its appropriate distance in accordance with the standard traffic plans in the contract.
0140-0172	The Traffic drums placed at the Rt. 8 Southbound, Exit 38 Gore Area could be slightly shifted right to avoid being hit by vehicles.	Adjust the location of traffic drums adjacent to the travel lane at exit 38 gore area to avoid vehicle hit.
0156-0180	Cones placed along the tangent at 120 feet spacing is too long for the gaps.	Traffic cone spacing should be spaced at 80 feet apart on a tangent.
0170-3546	I-95 NB: The traffic cones were placed too far apart (160 feet to 240 feet apart) in the tangent area. Traffic drums/cones in the tapered area distance were placed too far apart. Multiple cones were knocked down probably because drivers were mistaken the openings as open lanes.	Traffic cones on the tangent should be spaced no more than 80 feet apart.
0170-3546	I-95 NB: In the tapered area traffic drums should be used instead of traffic cones.	Traffic drums are to be used on the transition area of the traffic pattern.
0170-3546	I-95 NB: Two left lanes closed with no buffer space between each lane closure. The lane closure patterns should be according to the M&PT Traffic Control Plans.	The lane closure patterns should be according to the M&PT Traffic Control Plans included in the contract.
0170-3546	I-91 SB: Two off ramps closed at once.	Traffic patterns should be no longer than two miles so closing one ramp at a time is best.
0172-0482	Traffic cones on tangent were place at 120 feet apart.	The spacing for devices on the tangent are to be 80 feet apart.
0172-0487	"End of Road Work" sign was not in the termination area.	It is recommended for the "End of Road Work "sign be place in the termination area.

PROJECT NO.	FINDINGS	RECOMMENDATIONS
0172-0487	Taper is too short in lengths.	It is recommended for the Taper to be
		extended to the correct length in
		accordance with the M&PT plans or the
		MUTCD guidelines for the posted speed
		along secondary roadways.
0172-0487	"Flagger" sign placed at improper location.	It is recommended for the "Flagger" sign to
		be placed in the beginning of the taper in
		accordance with the M&PT plans or the
		MUTCD guidelines.
0174-0428	The liability signs were mounted after the	The liability signs should be the first signs
	advance warning signs.	motorists see to give them the opportunity
		to exit before proceeding through the work
		zone if they choose not to.
	Lighting Issues	
0174-0430 A	The equipment lights were used as the only	For night operations, bring in supplemental
	Illumination for the roadway work.	illumination for motorists to see the
		operations is a good practice.
	Message Confusion	
0118-0169	The first line of the CMS says I-91N.	The CMS should say I-91 NB for clarity to
		the motorists.
0135-0301	The detour signs on Washington Street into	Construction signs should be installed
	Henry Street and South State Street into	according to the traffic plans to prevent
	Atlantic Street are confusing as motorists	confusion to the motorists.
	approach the closed bridge.	
0135-0301	The detour sign northbound on Atlantic	A split direction sign is recommended
	Street where the through lane is drummed	instead.
	off at Dock Street is confusing (the detour is	
	signed to go right).	
0135-0325	I-95 NB Closure and Transition: There were	Refer to the Portable Variable Message
	CMS with spelling errors ("Taffic" instead of	Signs Operation Guide.
	"Traffic"). The message "Exit9 Closed –	
	Follow – Detour" should have split into two	
	phases. Each phase should only consist of a	
	maximum of 3 lines with a maximum of 8	
	characters (including spaces) per line. In this	
	case the message should have been the	
	following: Phase 1: Exit 9 – Closed; Phase 2:	
	Follow – Detour. Portable CMS were	
	installed in the shoulder that were not	
	adequately delineated. Each CMS, per the	
	M&PT special provision, should be delineated	
	with a minimum of five traffic drums when	
	placed in the shoulder.	

PROJECT NO.	FINDINGS	RECOMMENDATIONS
0140-0172	The Second Portable Arrows Flashing Arrows Board on Rt. 8 Northbound is deemed to be redundant since there is only 1 lane closed.	Portable arrow flashing board located on Rt. 8 Northbound prior to the beginning of the taper is not recommended
0151- 0326/0312/0313	CMS and VMS are stationed too close to each other.	Any CMS and VMS have to be at least 1000 feet apart so messages aren't confusing to the motorists.
0152-0158	I-395 NB: There was a 1-frame CMS displaying "Route 2 Closed xx-xx-xx" at the junction of I-395 and I-95. Maybe it was for another project, but provided conflicting message through the work zone.	Please investigate and remove/turn off as needed.
0170-3546	I-95 NB: Upside-down detour arrow sign used as arrow board.	Flashing arrows are to be used within a closed lane not DETOUR arrows.
0172-0482	The message on the Pre-Warning Vehicle said "SLSLW".	The messages on CMS or PWV needs to be clear to prevent confusion to the motorists.
0174-0428	The CMS on the PWV had a scrambled message.	The message should be clear to prevent confusion.
	Message Visibility	
0135-0301	The construction signs on Atlantic Street and North State Street into South State Street are obstructed by trees.	Construction signs need selective clearing in front so motorists can view signs and be directed properly through detour.
0135-0301	Obstructed signs and CMS were noted	Review the location of construction signs and Changeable Message Signs to assure visibility in advance so drivers have adequate time to react to them.
0172-0487	"Raised Catch Basin" Diamond Shape Post mounted not in proper height.	It is recommended for the "Raised Catch Basin" sign to be mounted at a 7 ft. height and 2 ft. minimum from the adjacent edge of pavement.
	More Signage Neede	ed
0135-0301	Missing sign noted.	At the end of Dock Street at Canal Street and at the left turn from Canal Street to North State Street, an Atlantic St. detour sign is recommended.
0135-0301	Missing detour sign.	It is recommended that an Atlantic St. detour sign be added along Canal Street northbound in the vicinity of South State Street for advance warning for the left turn onto North State Street.

	Oversize/Overweight Accomp	modations
0063-0708	According to RFC no. 05, the Contractor and the State agreed back in March 2019 to stage construction on the bridges instead of all detours as originally proposed. The Contractor agreed to maintain a minimum of 13 feet travel way. During the inspection 5/22/19, the ramps from Sisson Avenue to I-84 WB and from I-84 EB to Sisson Avenue seemed to be narrower than 13 feet. The project inspector should verify the minimum width on those two ramps for OS/OW restrictions.	Ramp width is essential for OS/OW permit restrictions.
	Pavement Marking Iss	ues
0102-0348	There have been concerns that the grinding of existing pavement markings is causing confusion because of the color of LMC on the concrete bridge deck, especially at night. The lighter concrete left behind after grinding can be misconstrued as a pavement marking, which conflicts with the actual pavement markings. There is a lack of contrast between the LMC deck and the white pavement markings.	Design should address this pavement marking issue for latex modified concrete wearing surface on the bridge deck for stage construction.
0174-0430 A	There was no temporary paint delineation in the middle of the roadway.	Temporary pavement marking should be placed to help delineate the edges of the lane especially in poor conditions.
	Personal Protective Equi	pment
0170-3546	DOT Inspectors were not wearing the proper PPE during the Work Zone Safety Review in the staging area at I-91 NB Exit 38.	Proper PPE should be worn at the work area to bring more visibility to the employees.
	Public Info/ Public Outr	reach
0135-0325	Best Practices was established for PI/PO efforts on this project.	The PI/PO efforts through coordination by FHI consultant was a huge success and represents a model to be used by CTDOT for similar projects. The media coverage provided the background to mitigate mobility impacts and eliminated traffic delays with trucks diversions to alternate routes.

	Proper Traffic Control Equ	iipment
0172-0487	One Flagger at mid-point along the roadway was missing (Stop / Slow) paddle.	It is recommended for the Flagger to properly use paddle and equipment at all times in accordance with the MUTCD guidelines and Flagger Handbook.
	Proper Use of Device	es
0102-0348	During the RRB, the crash truck had a HMIIFA in the "caution" mode instead of showing a left arrow. In this instance, the crash truck was being used to close the center lane while drums were being installed in the right lane.	It is recommended for the crash truck to use the appropriate arrow board designation. This operation should be showing an arrow board instead of being in "caution" mode.
	Protection of the Work	Zone
0014-0185	Drop off next to Route 1 is greater than 3 inches deep.	The drop off needs positive protection so no vehicle drives off and gets damaged.
	Quality of Devices	
0096-0200	The reflectivity of the advance warning signs appears marginal.	The signs should be cleaned so their reflectivity can be at its best especially for nighttime viewing.
0102-0348	Some traffic drums need replacing due to lack of reflectivity.	It is recommended to replace some channeling traffic control devices to meet the MUTCD and ATSSA quality devices guidelines.
0135-0301	A CMS has light bulbs that need replacing.	Refer to ATSSA's Quality Guidelines for Temporary Traffic Control Devices and Features.
0135-0325	During the closure of the I-95 SB Exit 9 off-ramp: a. The pattern included traffic cones that had visible damage. b. One of the High Mounted Internally Illuminated Flashing Arrows was in the wrong mode.	 a. Replace marginal traffic cones. b. The HMIIFA should have been in the flashing left arrow mode, not the caution mode, when closing the right lane to install the pattern.
0152-0158	I-395 NB: Marginal construction signs, traffic drums, and traffic cones.	Devices in marginal conditions need to be replaced with new ones.
0152-0158	I-395 SB: The CMS attached to the Prewarning vehicle did not work properly.	The message needs to be corrected or turned off so the motorists aren't confused.
0152-0158	I-395 SB: Marginal construction signs, traffic drums, and traffic cones to be replaced with new ones.	Devices need to be replaced with new ones.
0156-0180	"Fines double" sign is marginal.	It is recommended to replace some traffic control devises due to poorreflectivity in accordance with the ATSSA Quality Guidelines.

0156-0180	"Shoulder Closed" sign is Unacceptable it is broken in one of the edges.	Replace broken sign. Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
0170-3546	Several cones and drums have poor	Refer to ATSSA Quality Guidelines for
	reflectivity.	Temporary Traffic Control Devices and Features.
0170-3546	A RAMP CLOSED sign that was mounted on waffle board has poor reflectivity.	Waffle board is not an acceptable substrate to mount construction signs on; the substrate needs to be more rigid per specifications.
0170-3546	I-95 NB: There were marginal traffic drums, cones, and signs placed.	Replace all marginal devices. Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
0170-3546	I-91 SB: Waffle board used for some of the construction signs.	Again, waffle board isn't an acceptable substrate.
0172-0487	Material for temporary work zones signs use fabric material that is not permitted.	It is recommended for the contractor to use plywood or steel plate substrate for temporary work zones signs.
0173-0498	The construction signs were mounted on waffle board.	Waffle board isn't an acceptable substrate. The boards can bend and the reflectivity of the sign will become distorted. The signs need to be replaced.
0174-0430 A	The construction signs are mounted on waffle boards.	The Department has written a policy to discontinue the use of waffle boards. The signs should be mounted on approved substrate.
	Queue Length	
0156-0180	Excessive queue observed northbound around 9 p.m.	It is recommended the queue be monitored and measures taken to provide advance warning of the queue by utilizing message boards or police vehicles in advance of the queue.
0170-3546	I-95 NB: Length of closed lanes was more than 3 miles.	Typical work zone 1.5 miles, but the District can approve longer length for paving jobs (2 miles or so).

	Rolling Road Block	(
0063-0703/ 0159-0191	Rolling Road Block used a Pre-Warning Vehicle but took 30 minutes to install pattern, once on I-91 NB and I-91 SB.	Refer to CD-2016-2: Work Zone Safety Rolling Road Block Procedure. The Rolling Road Block should only take 15 minutes to set up the advance warning signs and taper. The crew should continue setting up the pattern from the closed lane allowing traffic through.
0096-0200	The Rolling Road Block start at 9:07 pm and ended at 9:41 pm (34 minutes).	The Rolling Road Block is allowed for 15 minutes to install the advance warning signs and the taper.
0102-0348	Rolling Road Blocks have been implemented mostly without a problem. They typically last for 15-20 minutes due to the length of the pattern being installed (nearly 2 miles). There have been instances of motorcycles and cars weaving between crash trucks to get ahead of the RRB. In such cases, the Contractor radios ahead and warns the worksite of the oncoming unauthorized vehicles.	RRB must adhere to the department policy not to exceed 15 minutes in duration.
0118-0169	Rolling Road Block started 1:12 pm. Unanticipated heavy Rain started 1:22 pm during the installation of the Advance Warning Signs. Operation was called off.	Refer the CD-2016-2 for future use of the Rolling Road Block. Post Report: The lane closure was completed after the storm had passed.
0135-0325	I-95 SB Closure and Transition: The rolling roadblock took 30 minutes instead of the 15 minute maximum allowed within the RRB.	Refer to the Work Zone Safety Rolling Road Block Procedure (Construction Directive CD-2016-2).
0135-0325	There were construction signs and traffic drums installed that were visibly damaged/dirty. There was some equipment with sections that were non-reflective. The left shoulder closure taper was not installed correctly. The traffic cones started on the shoulder line, not at the edge of road (median barrier in this case). Traffic drums should also have been used instead of cones.	Refer to the Work Zone Safety Rolling Road Block Procedure (Construction Directive CD-2016-2).
0151- 0326/0312/0313	The Rolling Road Block started at 10:17 pm and ended at 10:40 pm (23 minutes).	The Rolling Road Block shouldn't exceed the allowable 15 minutes to set up the advance warning signs and taper.
0152-0158	I-395 NB: Rolling Road block went from 9:28 am to 9:44 am (16 minutes) with approximately 2.5 miles backup.	Refer to the Construction Directive CD- 2016-2. Length of queue need to be closely monitored and use PWV for queue management.

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0152-0158	I-395 SB: Road block went from 10:05 am to 10:25 am (20 minutes) with approximately 1.75 miles backup.	Adhere to the RRB procedure in Directive CD-2016-2.
0152-0158	I-395 SB: Road block started too far back. It took 5 minutes extra.	Maybe the RRB would have taken 10 minutes with more efficient operation.
0170-3546	I-95 NB: The Rolling Road Block on I-91 NB went from 7:04 pm to 7:15 pm (11 minutes).	This RRB was within the acceptable time of 15 minutes.
0170-3546	I-95 NB: No pre-warning vehicle was used for the Rolling Road Block procedure.	In areas where there is poor sightlines, a pre-warning vehicle is best to prevent back of queue crashes.
0170-3546	I-91 SB: The Rolling Road Block on I-91 SB went from 7:44 pm to 8:20 pm (36 minutes) with approximately 3 miles of backup.	The RRB went on for too long and needs to be reduced to 15 minutes allowed in the Construction Directive CD-2016-2.
	Stakeholder Communic	ation
0063-0708	It was anticipated that Project no. 63-699/700/701 would be done by this time, but that project is well behind schedule. The inspector mentioned that the shift/staging that will have the most impact to I-84WB is set to take place around July/August of 2019. A staging coordination meeting between this project 63-699/700/701 and 63-705 may be needed prior to this work.	A representative from the Office of Traffic Engineering will be available if needed to assist the District as a resource.
	Trafficperson Issue	es s
0063-0708	The inspector mentioned that Trafficperson (Municipal police and Uniformed flagger) were added to the project. The Traffic Engineer checked the original contract documents. All work under the bridges were to be done during the detour except for some traffic impact on Capitol Avenue. That is why the project only included state police for Trafficperson.	The addition of trafficperson items are deemed to be warranted to meet the field change conditions.
0102-0348	There have been issues with the Contractor refusing to work due to a lack of State Police presence. If State Police are ordered, but none show up, then the Contractor takes the position that work cannot be performed that night. This has been an ongoing issue, since the project might not maintain its schedule. State Trooper unavailability affects the Contractor's company approach to safely set up the MPT patterns.	It is recommended to make it clear in writing to the contractor that State police is not required for the contractor to perform work. Use TMAs as required in the M&PT specifications.

Transportation Management Plan		
0156-0180	Missing TMP required for interstate significant projects.	It is recommended to ensure 16 series signs are placed at appropriate places along I-95 and ramps as needed. Also, the designer should address the requirement for TMP or significant projects in accordance with the 23 CFR 630 Subpart J.

Summary

The successful practices and areas that require improvement found during the reviews will be addressed through training the inspection staff and the Biennial Work Zone Safety and Mobility Process Review which is required by federal regulation. The recommendations associated with the findings may be addressed as follows:

- Best practices can be implemented through specification changes, creation of new policies, and inspector training.
- New policies can be created to address potential unsafe practices in the field.
- Training is the most effective tool to address systemic issues found in the field, such as contract and plan enforcement and using devices of acceptable quality. Inspectors can be made aware of deficiencies verbally in the field, through the review reports, and during the winter inspectors' training. Another training resource is the use of the Inspectors' Pocket Guide Checklists.
- Timely communication between the Construction field staff and other Department units will yield effective project coordination in getting issues resolved.
- New hires and Interns should take and pass the TC3 or AASHTO training for work zone safety prior to entry in field work.

The Work Zone Safety Field Reviews are instrumental in identifying how successful safety practices are functioning in the field and for receiving feedback from personnel who use them on a continuous basis. The Department will continue to benefit from implementation of these successful strategies for effective work zone safety and mobility.