Best Practices for Maintenance of Traffic on Interstate Pavement Rehabilitation Projects

Report Number: KTC-24-34

DOI: https://doi.org/10.13023/ktc.rr.2024.34

Kentucky Transportation Center
College of Engineering, University of Kentucky, Lexington, Kentucky

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University of Kentucky

Research Report
KTC-24-34

Best Practices for Maintenance of Traffic on Interstate Pavement Rehabilitation Projects

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June 2024

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
KTC-24-34		

4. Title and Subtitle
Best Practices for Maintenance of Traffic on Interstate Pavement Rehabilitation Projects

5. Report Date
June 2024

6. Performing Organization Code

7. Author(s):
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8. Performing Organization Report No.
KTC-24-34

9. Performing Organization Name and Address
Kentucky Transportation Center
College of Engineering
University of Kentucky
Lexington, KY 40506-0281

10. Work Unit No. (TRAIS)

11. Contract or Grant No.
SPR 23-643

12. Sponsoring Agency Name and Address
Kentucky Transportation Cabinet
State Office Building
Frankfort, KY 40622

13. Type of Report and Period Covered

14. Sponsoring Agency Code

15. Supplementary Notes
Prepared in cooperation with the Kentucky Transportation Cabinet

16. Abstract
Across the United States, aging roadway infrastructure has led state departments of transportation (DOTs) to increase their focus on pavement rehabilitation projects. These projects upgrade existing infrastructure to meet the needs of current levels of vehicle use. On interstate rehabilitation projects, maintenance of traffic (MOT) is an especially important consideration. Having a good MOT plan for completing construction work is critical for maintaining facility capacity while ensuring the safety of the traveling public and roadway construction staff. This study explores on behalf of the Kentucky Transportation Cabinet (KYTC) best practices for MOT on interstate pavement rehabilitation projects. Based on a review of existing design guidance, this report summarizes practices currently used by KYTC. It also documents ideas for improving MOT collected through interviews with construction personnel at both the Cabinet and other state DOTs. Based on this information, the report advances nine recommendations for strengthening KYTC's MOT procedures.

17. Key Words
maintenance of traffic, interstate pavement rehabilitation, traffic control, temporary traffic control

18. Distribution Statement
Unlimited with approval of the Kentucky Transportation Cabinet

19. Security Classification (report)	20. Security Classification (this page)	21. No. of Pages	19. Security Classification (report)
Unclassified	Unclassified	25	

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Executive Summary

The Kentucky Transportation Cabinet (KYTC) maintains 16 interstate highways and has the eighteenth largest interstate network in the United States by lane miles. KYTC's 2022 *Enacted Highway Plan* set two- and four-year target goals of having 50 percent of interstate pavement in good condition. In 2022 the agency spent $162 million on interstate pavement rehabilitation projects. In the first nine months of 2023, KYTC had surpassed that number with over $250 million spent across 30 projects.

During construction of interstate pavement rehabilitation projects, it can be challenging to maintain two lanes of traffic in each direction. The most common practice to maintain two lanes of traffic is to use a full-width shoulder as a through lane during construction phases. This approach, however, presents challenges when there is limited shoulder width, shoulder pavement lacks the depth to structurally maintain traffic, or the depth for rehabilitation requires more lateral clearance for the lanes that are under construction. If KYTC is to achieve its goal of having 50 percent of interstate pavements in good condition, the agency must consider how maintenance of traffic (MOT) on interstate pavement rehabilitation projects affects project delivery but also traffic throughput.

To identify MOT best practices that can be applied on KYTC interstate pavement rehabilitation projects, a team of Kentucky Transportation Center (KTC) researchers interviewed subject-matter experts (SMEs) who have experience managing interstate pavement rehabilitation projects across the state, reviewed guidance issued by other states, and interviewed staff from the state departments of transportation in Ohio, Missouri, and Louisiana. Based on this effort, researchers developed nine recommendations for improving MOT on interstate pavement rehabilitation projects. These are summarized in Table E1 and are described more fully in Chapter 5.

Table E1 Recommended MOT Best Practices

1.	On interstate pavement rehabilitation projects with an AADT < 25,000, consider the use of daytime lane closures for construction activities.
2.	Collect and measure asphalt cores of the existing shoulder within the project limits during the Project Development phase if MOT plans involve shifting traffic to the shoulder. *Note: Could apply to all multi-lane divided highways.*
3.	During the Project Development phase, decide if the long-term benefits of installing full-depth pavement on shoulders outweigh the initial cost of installation. *Note: Could apply to all multi-lane divided highways.*
4.	In all instances where an existing shoulder has a rumble strip and the temporary traffic control designates the shoulder for use as a through lane, mill the rumble strip and replace with asphalt so the pavement can withstand temporary traffic loads.
5.	During the Project Development phase, measure the existing structure width to determine if adequate width exists to maintain proper traffic lane widths during MOT phases.
6.	Evaluate if traffic control and site safety improvements are visible to all motorists by piloting the use of sequential lighting on temporary traffic control barrels in lane closure tapers. *Note: Could apply to all highway projects requiring nighttime lane closures.*
7.	In addition to the portable queue warning alert system currently used by KYTC, pilot the use of signage to limit the reduced speed limit to an active work zone while workers are present.
8.	Participate in American Traffic Safety Services Association (ATSSA), whose core focus is advancing roadway safety.
9.	Develop and implement law enforcement officer (LEO) traffic control training.

Chapter 1 Introduction

During construction of interstate pavement rehabilitation projects, the Kentucky Transportation Cabinet (KYTC) often finds it challenging to maintain two lanes of traffic in each direction. The standard practice is to use a full-width shoulder as a through lane to maintain the existing number of lanes while work is performed on adjacent lanes. Difficulties arise when the existing shoulder is not wide enough to use as a through lane, or the pavement depth cannot structurally maintain the traffic. Designers may also face challenges creating maintenance of traffic (MOT) at interchanges due to the width of mainline bridges, lateral clearance of crossroad structures, and ramp lengths. This report explores approaches currently used by KYTC and other state departments of transportation (DOT) for MOT pavement rehabilitation projects and, based on this review, recommends best practices. Table 1.1 lists the material discussed in each chapter.

Table 1.1 Report Structure

Chapter	Content
2	• Reviews KYTC's existing MOT guidance.
3	• Highlights the findings of the interviews conducted with KYTC construction engineers responsible for overseeing pavement rehabilitation projects.
4	• Presents the findings of interviews with other state departments of transportation (DOT).
5	• Comprehensive list of detailed recommendations based on research findings.

Chapter 2 KYTC's Current Maintenance of Traffic Guidance

The *Highway Design Guidance Manual* (2022) was reviewed to capture KYTC's current practices for MOT decision making. Pavement rehabilitation projects on high volume, multi-lane divided facilities (including interstates and freeways) require lane shifts to establish the most distance between work areas and the traveling public. HD-206.2 recommends maintaining the existing number of lanes throughout the construction zone, especially on interstates and other major routes. To accomplish this, one lane of traffic may be diverted onto the shoulders if there is sufficient width. However, shoulders may or may not have adequate pavement structure to support traffic volumes and types characteristic of higher-volume roadways.

2.1 Design Guidance for Shoulders on Multi-Lane Divided Facilities

The usable shoulder is the actual width available for vehicles to make an emergency or parking stop (HD-702.10.2). Shoulder width and shoulder pavement design guidance are tailored to these uses, which results in a shoulder that has a reduced pavement structure compared to the adjacent traveled lanes. Design parameters for superelevation and cross slope are tied to the primary traffic configuration and do not consider the potential of using a temporary shoulder use as a through lane. Superelevation and shoulder break guidelines address cross slope in relation to the mainline, ensuring shoulder cross slope matches the adjacent lane. A break in cross slope should not occur at the edge of the through lanes. HD 702.5 states for a paved shoulder greater than or equal to eight feet "Maintain a shoulder slope of 4% (8% for earthen shoulders) until the maximum algebraic difference in rate of cross-slope between the shoulder and the roadway exceeds 7%. As pavement superelevation increases, maintain the 7% break in slope and keep the shoulder flattened until the shoulder slope is level. Further increasing pavement superelevation requires (a) sloping the inside half of the shoulder toward the pavement (+1%), and (b) sloping the outer half of the shoulder away from the roadway (-1%), for mainline superelevation rates of 8%. This may not apply to the inside shoulders of median sections and multilane facilities," conditions tolerable for emergencies and vehicles coming to a stop to temporarily park. However, if the full shoulder width is used even temporarily to move through traffic, the roll-over and location of the shoulder break can affect travelers.

2.2 Shoulder Pavement Thickness

HD 1001.10 addresses shoulder pavement design. Specifically, it states that "Thickness should be determined to insure adequate structural support is provided to meet any anticipated shoulder traffic. Typically, shoulders should be designed to accommodate a minimum of 20 percent of the mainline Equivalent Single Axle Loads (ESALs). This generally correlates to carrying the top asphalt base and surface courses onto the shoulder with full-depth DGA below." Depending on the traffic volumes and types, this can translate to about one-third of the mainline pavement design thickness when asphalt is used.

Section 4.1 of KYTC's *Pavement Design Guide* (2018) addresses shoulder design. For shoulders on facility types addressed in this report, guidance notes that pavement thickness must be sufficient to handle anticipated shoulder traffic. In areas where shoulder thickness cannot withstand through traffic volume during construction, temporary asphalt pavement is installed to meet traffic needs. Figure 2.1 shows the use of temporary asphalt pavement along the outside shoulder that was installed to accommodate temporary traffic control while operating as a through lane. There is no specific guidance for temporary use of shoulders for through traffic. Further, the guidance references Average Annual Daily Truck Traffic (AADTT) instead of ESALs, with a recommended threshold volume for pavement design of 25 percent of the mainline AADTT.

Figure 2.1 Temporary Asphalt Pavement on Outside Shoulder on Multi-Lane Divided Highway Project

2.3 Considering Shoulder Widths on Structures

During MOT planning, additional consideration must be given to structures. HD-702.12 recommends continuance of the usable outside shoulder width across structures and a minimum inside shoulder width of four feet across bridges on four-lane divided highways. However, referencing AASHTO guidance, KYTC design guidance allows for narrower shoulder widths on long structures where the additional structure width is cost prohibitive. For a rehabilitation project with lane shifts, these structures can result in pinch points that restrict the available shoulder width for temporary traffic configurations (Figure 2.2).

Figure 2.2 Narrow Bridge on Multi-Lane Divided Highway Project

Chapter 3 Interviews with KYTC Construction Staff

Nine KYTC employees who have construction management experience overseeing interstate pavement rehabilitation projects were interviewed. Interviewees described their experience with multiple MOT scenarios, the mitigation measurements they used, and the outcomes. Interviewees were asked to focus on projects that took place on four- and six-lane interstate routes where the average annual daily traffic (AADT), percentage of single trucks, and percentage of combo truck fell within the ranges listed in Table 3.1.

Table 3.1 Traffic Volume Statistics for Kentucky Interstate Rehabilitation Projects Studied

	Lower Limit*	Upper Limit
Average Annual Daily Traffic (AADT)	7,974	170,069
Percent Single Trucks	0.90	10.18
Percent Combo Trucks	1.40	30.60

* Data collected showed zero for some of the traffic volumes. Zero volume traffic were considered outliers, and therefore these points were removed from the final presentation of the data for the purposes of this report. See Appendix A for all data points.

Over half of the interviewees had experience with both four- and six-lane interstate projects. Projects spanned urban and rural areas, providing a representative sample of Kentucky's interstate system. The most common project type was asphalt resurfacing — one-third of the interviewees had experience widening an existing four-lane interstate to six lanes.

3.1 Traffic Control Configurations

The most common traffic control configuration mentioned by interviewees was a single lane closure. In some areas, having a single lane open to traffic was sufficient given the AADT and the lane closure times specified in the project plans. In areas where adequate lane widths were possible if the shoulder was used as a driving lane, some interviewees said they closed the inside shoulder and left lane while maintaining two lanes of traffic in the right lane and outside shoulder. Figure 3.1 shows a lane shift using the outside shoulder as a through lane on a freeway as defined in the *Manual on Uniform Traffic Control Devices* (MUTCD).

Figure 6H-36. Lane Shift on a Freeway (TA-36)

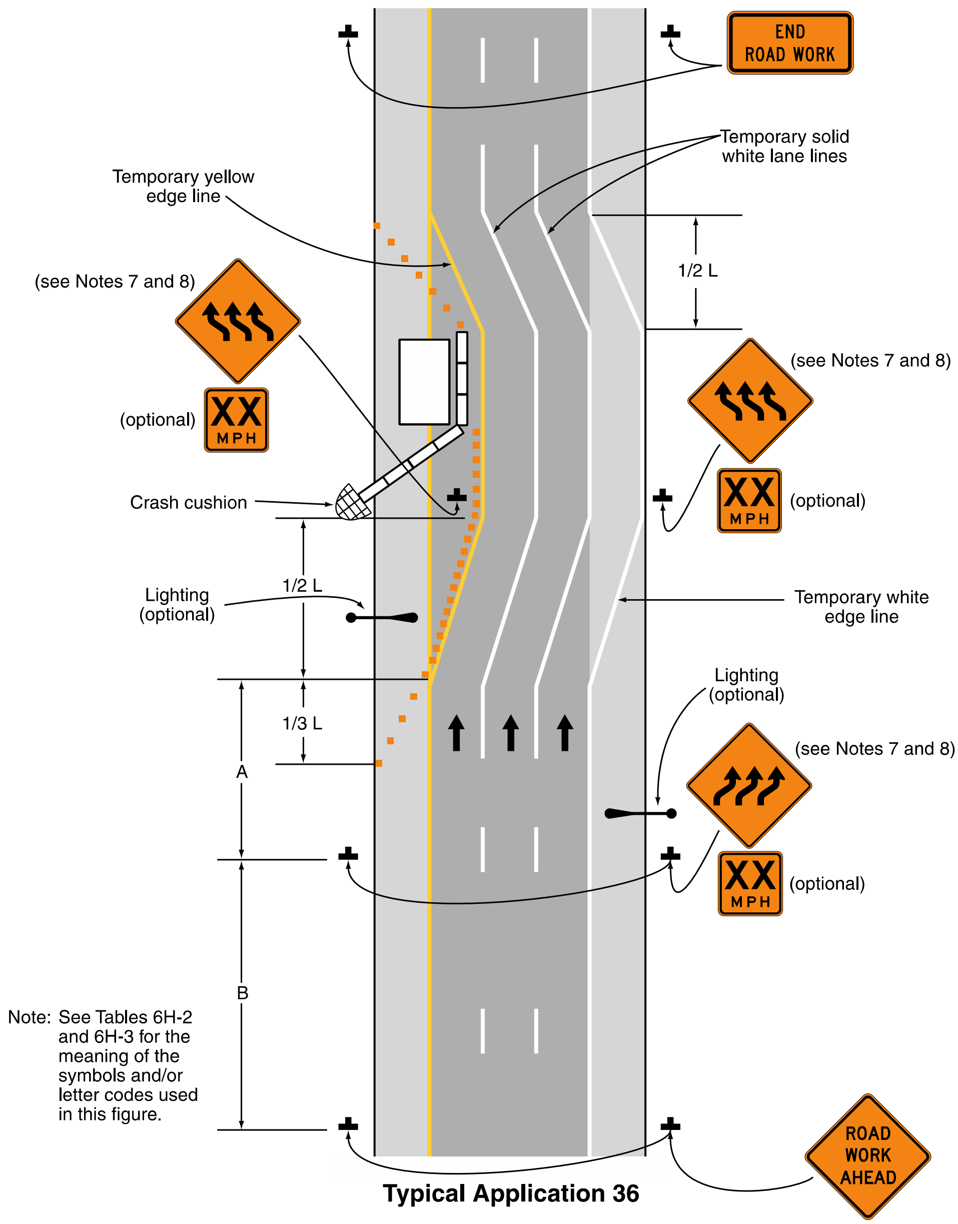

Figure 3.1 Lane Shift on a Freeway (TA-36) from the MUTCD

Some interviewees described utilizing lane shifts within project limits to accommodate the active work area. Use of this method allows the original lane closure taper to stay in place throughout the duration of the project, and traffic control devices within the work zone to be updated to match the active work area.

To illustrate this situation, take the example of a four-lane divided highway where there is a right lane closure as traffic approaches the construction zone. If work is happening in the right lane, traffic continues through the work zone in the left lane. If construction occurs in the left lane, traffic will still approach the construction area with a right lane closure. But then traffic will shift to the right lane (closing the left lane for construction) and continue through the active work zone in the right lane. Interviewees that used this traffic control pattern said that vehicles tended to stay closer to the construction zone speed limit. It also reduced the likelihood of speeding through the work zone and increased worker safety. Figures 3.2, 3.3, and 3.4 depict how a driver maneuvers through the lane shift during active construction of an interstate pavement rehabilitation project in Kentucky.

Figure 3.2 Right Lane Closure on Interstate Pavement Rehabilitation Project

Figure 3.3 Approaching a Lane Shift on Interstate Pavement Rehabilitation Project

Figure 3.4 Lane Shift on an Interstate Pavement Rehabilitation Project

Median crossovers and chutes were also discussed as temporary traffic control configurations. Median crossovers move all traffic to one side of a divided highway to complete all construction necessary on the opposite side (e.g., all traffic moved to the northbound side, while construction is completed on the southbound side). Traffic chutes funnel traffic into a single lane that is channeled using temporary barrier wall. Interviewees favored the median crossover because it moves traffic away from the active construction zones. It can, however, be more expensive to implement given the additional grading and temporary pavement that is typically necessary to accommodate the traffic shift to the opposing side. Barriers such as cable guardrail or concrete median wall along multi-lane divided highways present an additional cost consideration when evaluating the use of a median crossover. Due to space limitations, this often requires reducing the number of lanes for traffic, which can be problematic where capacity is at a premium.

Traffic chutes were the least favored option. A major issue with this configuration is they lack areas for vehicles to move out of the through lane (e.g., a stalled car or non-injury crash does not have access to a shoulder to move out of the way), which can lead to traffic queues and hamper first responder access. Another challenge is that chutes, which are typically lined with concrete barrier walls, do not always align with existing drainage structures, and this may complicate pavement drainage. Light to moderate rainfall usually does not pose issues and may be allowed to runoff the pavement naturally. However, pavement slopes and drainage functionality should be studied for MOT configurations that incorporate traffic chutes. A drainage review should include consideration of existing drainage structures in the final MOT layout.

3.2 Field Observations — Damages to Roadway Assets

Several interviewees shared experiences with projects where temporary traffic control resulted in shoulder damage. One interviewee described damage inflicted on a newly installed edge drain by traffic temporarily using the newly constructed shoulder. Once the construction phase requiring the traffic configuration was completed, failed edge drains were repaired or replaced.

Another concern several interviewees highlighted was deterioration of the shoulder where a milled rumble strip existed prior to the temporary traffic configuration on the shoulder. Typical methods to dampen the rumble strip include either a scratch asphalt course (where pavement depth is sufficient for traffic) or milling out and filling with temporary asphalt. In either case, interviewees saw temporary asphalt material fail during the construction phase, likely because of a weakened pavement structure in the vicinity of the milled rumble strip. Addressing the existing milled rumble strip prior to construction activities is imperative to reduce the likelihood of additional impacts on traffic once construction operations begin.

When temporary traffic control requires use of the outside shoulder as a through lane, pavement failures where an existing rumble strip was covered by temporary means can become increasingly difficult to correct. Typically, it requires moving traffic into a single lane to allow for pavement repairs of temporary material on the shoulder. This negatively impacts traffic, interrupts construction productivity, and can potentially slow construction or increase materials cost.

3.3 Additional Traffic Control Comments

When asked if they had other comments about traffic control practices, several interviewees brought up queue protection and the use of a portable queue warning alert system (PQWAS). PQWAS involves strategically placing message boards, sensors, and collecting crowdsourced data in and around the construction project limits to deliver real-time notifications on traffic conditions. Message boards placed upstream of a project receive these data and alert the traveling public and construction project managers if the traffic in the work zone is slow or stopped.

Interviewees described positive experiences using PQWAS, especially in urban areas or during peak volume hours, where the message boards provide drivers with an opportunity to consider an alternative route due to slow or stopped traffic in the work zone. Another feature of the system is queue protection vehicles. The queue protection vehicle is placed on the shoulder of the roadway approximately half-mile upstream the queue. The vehicle displays a message to warn drivers of queued traffic ahead and is relocated as needed to maintain at least a half-mile spacing ahead of the queue. Interviewees harbored mixed opinions on queue protection vehicles. One interviewee said that they worked fine on a project but noted the area had shoulders wide enough to accommodate the vehicle. Others were concerned with the vehicle backing up on the shoulder into oncoming traffic, and another stated that by the time the queue protection vehicle is in place, the queue is no longer an issue.

Chapter 4 Review of State Transportation Agency Maintenance of Traffic Practices

Because few academic publications have addressed MOT on interstate pavement rehabilitation projects, it was decided the best way to understand current best practices would be to speak with state DOT staff. They are on the front lines and have the most fruitful insights into what works and what does not. Nine people across the following state DOTs were interviewed:

- Louisiana Department of Transportation and Development (LaDOTD)
- Missouri DOT (MoDOT)
- Ohio DOT (ODOT)

All interviewees had experience working on four- and six-lane interstate routes. Other project types interviewees had experience with included interstate asphalt widening (e.g., adding a third truck-climbing lane, going from four to six lanes) as well as asphalt resurfacing.

4.1 Traffic Control Configurations

The most common traffic control configurations used by these agencies are a single lane closure and transforming a shoulder into a through lane to maintain two lanes of traffic. Staff in each state said they have evaluated crossover configurations, and while they are an ideal solution, they are rarely used.

LaDOTD and MoDOT staff said that their shoulders are not built with full depth pavement. When temporary traffic phasing uses the shoulder (outside or inside) the agencies place appropriate asphalt pavement depth to accommodate traffic needs. In Missouri, inside shoulders are not built with full depth pavement, but most contractors recommend building them to full depth to complement their construction means and methods. The interviewee from MoDOT explained that the agency relies on a practical design and has begun futureproofing shoulders with full depth pavement in locations deemed most practical.

4.2 Time and Date Restrictions on Traffic Control

On most MoDOT interstate pavement rehabilitation projects lane closures are only permitted at night. The agency has found daytime closures are too restrictive and negatively impact construction production hours.

ODOT's Permitted Lane Closure Schedule (PLCS) is an online system used by contractors and agency maintenance crews to determine the minimum number of lanes (MLO) that must be kept open on their projects. MLO is specified for each day of the week in half-hour intervals and is calculated based on traffic volumes. If a project has multiple segments with conflicting MLO schedules, during project development ODOT will apply the more restrictive output across the entire project. Figure 4.1 shows the new PLCS interface, including the options for schedule search and the layout of schedule details.

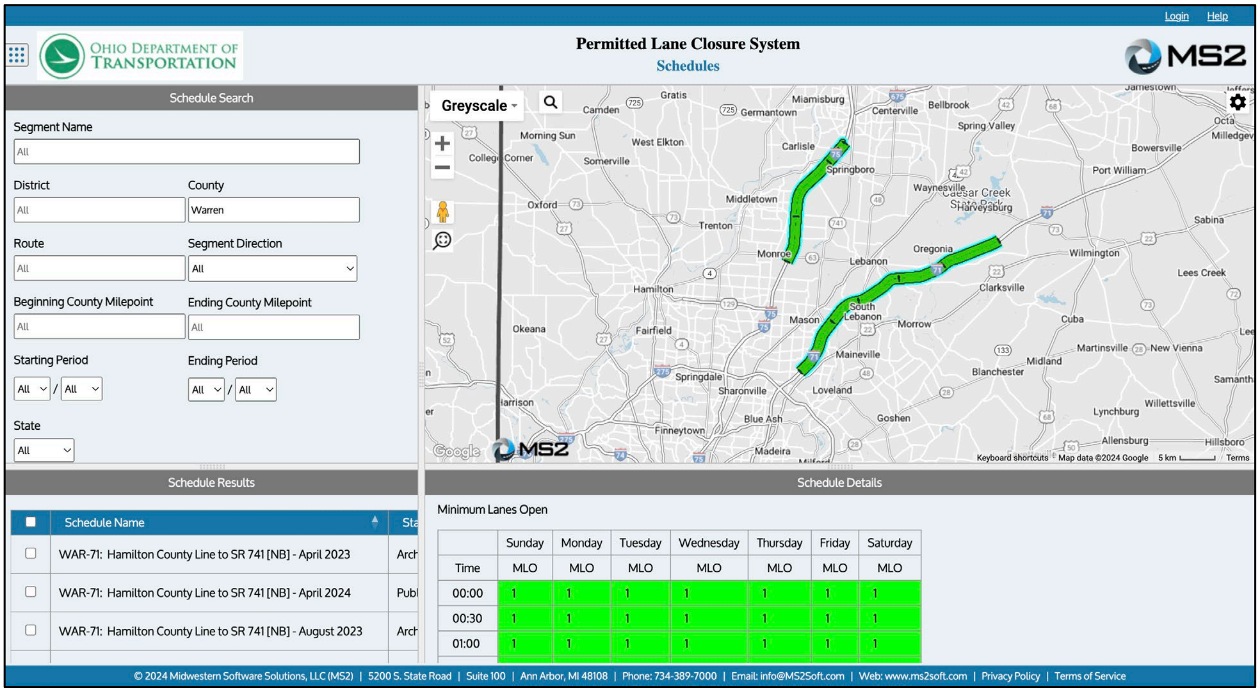

Figure 4.1 Ohio DOT Permitted Lane Closure System Interface

4.3 Additional Traffic Control Comments

Overall, respondents gave PQWAS positive reviews. The LaDOTD interviewee noted when PQWAS was first used it was difficult to accurately estimate item costs, but gaining experience with the process has led to improvements.

ODOT's standard procedure requires that use of a PQWAS be considered if a queue extends beyond three-quarters (3/4) of a mile. The agency has various levels of approval to implement the system. Additionally, districts have the option of adding PQWAS if they expect a project will significantly impact queueing during construction.

Interviewees from both MoDOT and LaDOTD commented on their use of smart work zones. MoDOT's experience has been positive overall, and the agency is in the process of updating its requirements based on piloting efforts. LaDOTD is working alongside its e-ticketing vendor, HaulHub, to provide real-time work zone traffic updates to Waze. While the functionality is still in the early stages of development, LaDOTD is optimistic this feature will improve traffic control within its work zones.

LaDOTD interviewees shared additional traffic control initiatives they have worked on, which are described below.

- Law enforcement officer (LEO) training geared toward LEOs that will be assisting with traffic control on an active construction project. This one and a half-hour long training course discusses proper chain of command at the DOT and appropriate positioning for LEOs during construction.

- The use of steady burn, low-intensity lighting attached to barrels in the temporary traffic control lane closure taper. In addition to implementing MUTCD work zone requirements, LaDOTD has seen positive results with attaching lights to the barrels in the taper. Lighting on the barrels guides traffic into the appropriate lane more efficiently than standard MUTCD requirements alone.

- LaDOTD plans to pilot the use of sequential lighting on barrels in the temporary traffic control lane closure taper. The agency hopes to determine if the directional movement of lighting on barriers in the taper improves traffic maneuvering over what has been observed with the steady burn lighting.

Chapter 5 Recommendations

Based on the review of KYTC's existing guidelines and conversations with other state DOT officials, several recommendations were developed for MOT on interstate pavement rehabilitation projects. While these recommendations are specified for pavement rehabilitation projects, several are applicable to multi-lane divided highways, and if adopted, could improve MOT for multiple KYTC project types.

- Recommendation 1: On interstate pavement rehabilitation projects with an AADT < 25,000, consider the use of daytime lane closures for construction activities. Some KYTC interviewees had experience reducing the interstate to one lane in each direction (24 hours, for multiple weeks), and did not observe negative impacts to traffic flow. Based on AADT figures retrieved from the KYTC Traffic Counts map, there are areas in the state where interstate work could be conducted during daytime hours.

- Recommendation 2: Collect and measure asphalt cores of the existing shoulder within the project limits during the Project Development phase if MOT plans involve shifting traffic to the shoulder. If adequate pavement depth is not found, include quantities and a construction phase to install proper pavement depth before moving traffic to the shoulder. Consider restricting truck traffic to the existing travel lane (i.e., trucks use left lane when traffic has been shifted to allow the shoulder to act as the right through lane) to reduce damage and subsequent repairs to the paved shoulder. This could apply to all multi-lane divided highways.

- Recommendation 3: During the Project Development phase, decide if the long-term benefits of installing full-depth pavement on shoulders outweigh the initial cost of installation. Decision factors can include route type (e.g., urban or rural), projected traffic volumes (including proportional truck volumes), temporary drainage, and projected economic development surrounding the project limits. This could apply to all multi-lane divided highways.

- Recommendation 4: In all instances where an existing shoulder has a rumble strip and the temporary traffic control designates the shoulder for use as a through lane, mill the rumble strip and replace with asphalt so the pavement can withstand temporary traffic loads. With respect to existing pavement depths on the project, mill and replace asphalt to a depth and width as directed by the Engineer (reference KYTC Standard Specifications for Road and Bridge Construction Section 101.03 Definitions).

- Recommendation 5: During the Project Development phase, measure the existing structure width to determine if adequate width exists to maintain proper traffic lane widths during MOT phases. Reduced lane widths (12' to 10') may be an appropriate solution in areas where the width of the structure does not allow for 12' lanes to be maintained during construction. If there is a significant issue with widths along the project limits, a better solution to expedite construction phasing may be the use of crossover MOT approach.

- Recommendation 6: Evaluate if traffic control and site safety improvements are visible to all motorists by piloting the use of sequential lighting on temporary traffic control barrels in lane closure tapers. This should be evaluated on projects with nighttime lane closures for increased visibility of the lighting system. It could apply to all highway projects requiring nighttime lane closures.

- Recommendation 7: In addition to the PQWAS currently used by KYTC, pilot the use of signage to limit the reduced speed limit to an active work zone while workers are present. There are multiple options for this process, including a static sign with flashing beacons that indicate when the reduced speed limit is enforced while workers are present, or a variable speed limit sign that digitally displays the currently enforced speed limit. Monitor traffic speed and crash data during the pilot project and determine if traffic control improves. To pilot the use of a static speed limit sign with flashing beacons or the variable speed limit sign, the KYTC will need to address any concerns with 603 KAR 5:320 Section 6 (4). It is written pursuant to KRS 198.390 (4)(b). ODOT's approved list of Digital Speed Limit (DSL) Sign Assemblies could be referenced to identify appropriate equipment.

- Recommendation 8: Participate in American Traffic Safety Services Association (ATSSA), an organization whose core focus is on advancing roadway safety through the design, manufacture, and installation of road safety and traffic control devices. The annual membership cost for a state DOT is $450. Organization-level membership confers membership to all employees at no additional cost. ATSSA has an established Kentucky chapter, multiple committees and councils that focus on multiple transportation safety topics (e.g., roadway worker protection, temporary traffic control, innovation), and hosts a Midyear Meeting for its members. Alternatively, individual membership for a public agency employee is $92 annually and could be obtained for a member of the Work Zone Traffic Control Committee.

- Recommendation 9: Develop and implement law enforcement officer (LEO) traffic control training. The National Highway Institute currently offers the *Safe and Effective Use of Law Enforcement Personnel in Work Zones* (Course No. FHWA-NHI-133119) which could be used to guide development of LEO-specific training in Kentucky. Training goals and outcomes should be determined by KYTC Work Zone Traffic Control Committee in light of current practices nationwide. A peer exchange with the LaDOTD would help KYTC collect additional information on the development, implementation, and effects of LEO training practices.

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Appendix A Traffic Characteristics of Selected Kentucky Interstate Rehabilitation Projects

County	Route	BMP	EMP	AADT	% Single Truck	% Combo Trucks
Bath	I-64	123.017	128.955	19,504	6.43	13.18
Bath	I-64	121.214	123.017	21,244	5.25	12.97
Bath	I-64	115.647	121.214	22,875	6.53	5.97
Boone	I-75	169.439	171.378	58,954	4.18	14.98
Boone	I-75	171.378	172.596	71,216	5.15	14.22
Boone	I-75	172.596	175.392	110,152	5.95	15.78
Boone	I-75	175.392	178.019	120,949	3.69	13.74
Boone	I-75	178.019	180.045	140,482	3.69	13.74
Boone	I-75	180.045	181.178	123,552	4.82	11.79
Boone	I-75	181.178	182.378	148,458	5.00	11.55
Boone	I-75	182.378	183.312	158,883	4.28	12.54
Boone	I-275	1.582	1.993	81,301	4.25	6.83
Boone	I-275	1.993	4.133	74,248	6.41	9.20
Boone	I-275	4.133	7.138	55,166	4.62	11.32
Boone	I-275	7.138	8.511	37,280	4.62	11.32
Boone	I-275	8.511	11.509	37,280	3.80	11.86
Boone	I-275	11.509	13.858	40,939	4.62	11.32
Boone	I-71	69.890	72.081	37,088	6.37	24.04
Boone	I-71	72.081	77.724	43,403	6.37	24.04
Boyd	I-64	190.724	191.507	22,623	5.84	14.41
Boyd	I-64	185.462	190.724	17,092	7.04	17.20
Boyd	I-64	181.339	185.462	14,937	7.04	17.20
Boyd	I-64	180.812	181.339	19,022	6.65	16.64
Campbell	I-275	73.061	74.857	78,644	3.58	3.15
Campbell	I-275	74.857	75.437	95,953	3.59	6.95
Campbell	I-275	75.437	77.070	81,768	3.56	2.77
Campbell	I-275	77.070	77.579	102,568	4.02	3.48
Campbell	I-275	77.579	78.764	102,568	4.02	3.48
Campbell	I-275	78.764	79.796	115,410	4.02	3.48
Campbell	I-275	79.796	82.475	91,951	4.02	3.48
Campbell	I-275	82.475	83.780	103,570	4.02	3.48
Campbell	I-471	0.000	1.745	92,781	1.85	1.50
Campbell	I-471	1.745	3.202	94,099	3.11	1.41
Campbell	I-471	3.202	3.858	92,942	3.11	1.41
Campbell	I-471	3.858	4.772	99,284	3.75	4.28
Campbell	I-471	4.772	5.016	99,528	1.38	1.40
Carter	I-64	178.494	180.812	19,022	6.65	16.64
Carter	I-64	171.607	178.494	20,432	5.97	15.43
Carter	I-64	161.453	171.607	15,446	6.09	18.75

County	Route	BMP	EMP	AADT	% Single Truck	% Combo Trucks
Carter	I-64	156.265	161.453	12,537	4.11	13.08
Carter	I-64	148.665	156.265	12,868	4.79	17.47
Fayette	I-64	87.433	89.480	40,128	4.32	9.26
Fayette	I-64	81.037	87.433	40,192	1.50	13.50
Fayette	I-64	71.000	74.729	33,868	4.45	14.30
Fayette	I-75	97.703	98.516	64,439	4.47	14.21
Fayette	I-75	98.516	103.890	72,360	3.60	12.82
Fayette	I-75	103.890	108.247	61,328	5.35	14.97
Fayette	I-75	108.247	109.677	73,690	5.35	14.97
Fayette	I-75	109.677	110.829	75,072	4.27	12.83
Fayette	I-75	110.829	112.834	107,297	7.82	9.30
Fayette	I-75	112.834	115.242	102,098	10.18	8.70
Fayette	I-75	115.242	117.944	90,324	5.26	15.19
Fayette	I-75	117.944	119.873	61,757	4.34	13.59
Fayette	I-75	119.873	120.792	63,512	6.12	13.38
Franklin	I-64	57.877	59.431	38,908	5.21	16.93
Franklin	I-64	53.118	57.877	48,162	5.38	12.88
Franklin	I-64	47.759	53.118	40,748	8.01	11.72
Franklin	I-64	46.303	47.759	45,255	6.33	12.22
Graves	I-69	21.285	22.192	14,041	6.79	22.00
Graves	I-69	22.192	23.636	13,891	6.79	22.00
Graves	I-69	23.636	24.687	10,935	6.80	23.27
Graves	I-69	24.687	27.419	8,172	6.22	29.05
Graves	I-69	27.419	34.487	7,974	6.22	29.05
Jefferson	I-64	18.860	23.974	62,024	5.15	12.61
Jefferson	I-64	17.053	18.860	89,081	3.80	5.74
Jefferson	I-64	14.857	17.053	103,939	2.78	4.06
Jefferson	I-64	12.078	14.857	125,991	3.00	3.65
Jefferson	I-64	10.103	12.078	63,025	2.50	5.23
Jefferson	I-64	7.576	10.103	82,994	4.73	5.60
Jefferson	I-64	6.070	7.576	69,906	4.73	5.60
Jefferson	I-64	5.734	6.070	79,991	4.73	5.60
Jefferson	I-64	4.786	5.734	144,000	0.00	0.00
Jefferson	I-64	4.559	4.786	90,900	3.29	5.51
Jefferson	I-64	3.878	4.559	87,355	3.29	5.51
Jefferson	I-64	2.625	3.878	58,404	3.16	6.95
Jefferson	I-64	0.762	2.625	65,180	3.29	5.51
Jefferson	I-64	0.000	0.762	81,936	3.79	4.81
Jefferson	I-71	9.063	11.315	72,476	3.37	16.04
Jefferson	I-71	5.096	9.063	65,749	2.96	10.88
Jefferson	I-71	1.724	5.096	61,377	0.00	0.00
Jefferson	I-71	0.000	1.724	50,858	6.37	0.00

County	Route	BMP	EMP	AADT	% Single Truck	% Combo Trucks
Jefferson	I-65	123.180	125.152	104,574	5.71	15.20
Jefferson	I-65	125.152	126.746	132,809	3.88	10.60
Jefferson	I-65	126.746	128.328	141,988	5.67	10.12
Jefferson	I-65	128.328	130.156	159,448	5.67	10.12
Jefferson	I-65	130.156	130.710	168,682	5.66	9.47
Jefferson	I-65	130.710	132.890	129,829	4.56	7.18
Jefferson	I-65	132.890	135.195	118,227	5.67	10.12
Jefferson	I-65	135.195	136.357	84,001	5.67	10.12
Jefferson	I-65	136.357	137.318	121,000	5.67	10.12
Jefferson	I-265	10.250	11.729	88,437	5.10	3.83
Jefferson	I-265	11.729	13.540	75,363	6.94	5.45
Jefferson	I-265	13.540	15.172	71,680	6.94	5.45
Jefferson	I-265	15.172	17.295	73,084	5.26	4.48
Jefferson	I-265	17.295	19.395	65,775	4.35	4.73
Jefferson	I-265	19.395	23.110	59,505	7.74	5.66
Jefferson	I-265	23.110	25.454	71,346	3.39	5.26
Jefferson	I-265	25.454	26.795	81,877	4.04	4.05
Jefferson	I-265	26.795	28.749	65,147	3.69	8.15
Jefferson	I-265	28.749	30.426	59,441	3.69	8.15
Jefferson	I-265	30.426	32.504	59,398	3.30	5.79
Jefferson	I-265	32.504	34.052	69,217	3.69	8.15
Jefferson	I-265	34.052	34.727	76,799	3.69	8.15
Jefferson	I-264	0.000	0.333	48,500	0.90	5.70
Jefferson	I-264	0.333	1.603	38,712	3.40	6.77
Jefferson	I-264	1.603	2.721	41,925	3.49	4.76
Jefferson	I-264	2.721	4.012	59,179	0.00	0.00
Jefferson	I-264	4.012	5.225	59,068	3.40	6.77
Jefferson	I-264	5.225	7.468	51,998	3.40	6.77
Jefferson	I-264	7.468	9.117	81,002	0.00	0.00
Jefferson	I-264	9.117	10.033	96,594	0.00	0.00
Jefferson	I-264	10.033	10.911	117,000	3.30	4.30
Jefferson	I-264	10.911	11.600	128,730	0.00	0.00
Jefferson	I-264	11.600	13.371	169,228	3.22	4.98
Jefferson	I-264	13.371	14.508	147,923	2.88	7.20
Jefferson	I-264	14.508	15.653	130,433	0.00	0.00
Jefferson	I-264	15.653	16.985	147,822	3.31	5.37
Jefferson	I-264	16.985	17.918	163,305	2.04	4.18
Jefferson	I-264	17.918	19.038	166,324	2.04	4.18
Jefferson	I-264	19.038	19.750	118,000	0.00	0.00
Jefferson	I-264	19.750	20.898	0	0.00	0.00
Jefferson	I-264	20.898	22.105	0	0.00	0.00
Jefferson	I-264	22.105	22.927	52,234	2.86	8.23

County	Route	BMP	EMP	AADT	% Single Truck	% Combo Trucks
Kenton	I-75	166.263	169.439	58,954	4.18	14.98
Kenton	I-75	183.312	183.685	158,883	4.28	12.54
Kenton	I-75	183.685	184.708	170,069	5.00	11.55
Kenton	I-75	184.708	186.274	108,382	3.40	10.02
Kenton	I-75	186.274	187.675	100,578	4.75	14.28
Kenton	I-75	187.675	188.595	99,648	3.33	10.87
Kenton	I-75	188.595	190.241	144,089	4.37	13.60
Kenton	I-75	190.241	190.453	134,007	5.08	13.17
Kenton	I-75	190.453	191.132	159,350	3.44	10.44
Kenton	I-75	191.132	191.777	132,112	3.92	10.79
Kenton	I-275	0.000	1.582	81,301	4.25	6.83
Laurel	I-75	27.943	28.852	44,819	5.43	22.75
Laurel	I-75	28.852	38.187	42,462	5.43	22.75
Laurel	I-75	38.187	40.704	55,588	3.65	16.58
Laurel	I-75	40.704	49.132	37,830	7.70	29.61
Laurel	I-75	49.132	50.767	39,651	7.70	29.61
Livingston	I-24	30.729	33.880	26,590	6.13	30.48
Livingston	I-24	29.352	30.729	33,836	6.13	30.48
Lyon	I-24	44.687	54.842	23,245	3.93	30.60
Lyon	I-24	41.616	44.687	23,988	3.93	30.60
Lyon	I-24	39.501	41.616	28,011	5.46	28.41
Lyon	I-24	33.880	39.501	26,590	6.13	30.48
Lyon	I-69	68.084	71.784	9,329	5.83	30.46
Lyon	I-69	71.784	73.694	10,233	5.83	30.46
Madison	I-75	73.408	75.516	49,731	5.00	20.36
Madison	I-75	75.516	77.468	58,744	4.22	17.27
Madison	I-75	77.468	82.832	46,948	4.22	17.27
Madison	I-75	82.832	87.150	66,135	4.72	18.51
Madison	I-75	87.150	89.833	69,418	4.72	18.51
Madison	I-75	89.833	94.715	79,365	4.47	14.21
Madison	I-75	94.715	97.038	74,443	4.47	14.21
Madison	I-75	97.038	97.703	64,439	4.47	14.21
Marshall	I-24	26.565	29.352	33,836	6.13	30.48
Marshall	I-24	24.961	26.565	34,367	7.83	25.00
Marshall	I-24	17.320	24.961	32,716	6.00	19.42
Marshall	I-69	34.487	40.809	7,974	6.22	29.05
Marshall	I-69	40.809	42.555	16,360	9.53	16.84
Marshall	I-69	42.555	46.942	18,671	9.53	16.84
Marshall	I-69	46.942	51.796	18,230	7.07	17.43
McCracken	I-24	16.151	17.320	32,716	6.00	19.42
McCracken	I-24	11.035	16.151	37,198	6.28	19.99
McCracken	I-24	6.389	11.035	43,979	5.45	17.27

County	Route	BMP	EMP	AADT	% Single Truck	% Combo Trucks
McCracken	I-24	4.328	6.389	34,533	5.45	17.27
McCracken	I-24	2.956	4.328	32,872	4.97	19.99
McCracken	I-24	0.000	2.956	29,262	5.21	21.33
Rockcastle	I-75	50.767	58.966	39,651	7.70	29.61
Rockcastle	I-75	58.966	62.013	45,422	3.77	20.24
Rockcastle	I-75	62.013	73.408	49,731	5.00	20.36
Rowan	I-64	137.268	148.665	12,868	4.79	17.47
Rowan	I-64	132.960	137.268	20,542	0.00	0.00
Rowan	I-64	128.955	132.960	19,504	6.43	13.18
Scott	I-64	68.936	71.000	33,868	4.45	14.30
Scott	I-64	67.106	68.936	38,758	0.00	0.00
Scott	I-75	120.792	124.868	62,512	6.12	13.38
Scott	I-75	124.868	125.528	56,485	6.12	13.38
Scott	I-75	125.528	126.764	51,753	0.00	0.00
Scott	I-75	126.764	129.199	51,753	6.12	13.38
Scott	I-75	129.199	136.468	48,428	7.68	27.81
Scott	I-75	136.468	143.239	47,034	5.60	18.58
Shelby	I-64	43.332	46.303	45,255	6.33	12.22
Shelby	I-64	35.163	43.332	43,984	5.52	15.07
Shelby	I-64	31.842	35.163	48,476	6.97	14.04
Shelby	I-64	27.596	31.842	50,900	5.37	11.25
Shelby	I-64	23.974	27.596	62,024	5.15	12.61
Whitley	I-75	0.000	10.548	27,432	4.11	26.40
Whitley	I-75	10.543	15.456	37,542	5.43	22.75
Whitley	I-75	15.456	24.670	38,213	5.43	22.75
Whitley	I-75	24.670	27.943	44,819	5.43	22.75
Woodford	I-64	65.270	67.106	38,758	0.00	0.00
Woodford	I-64	59.431	65.270	38,908	5.21	16.93