ITT West Central Safety Summit
Technical Session 2

September 4, 2025

Presented by:
John D. McGregor, P.E., INDOT TMD Traffic Operations Director
Mischa A. Kachler, P.E., INDOT Work Zone Safety Section

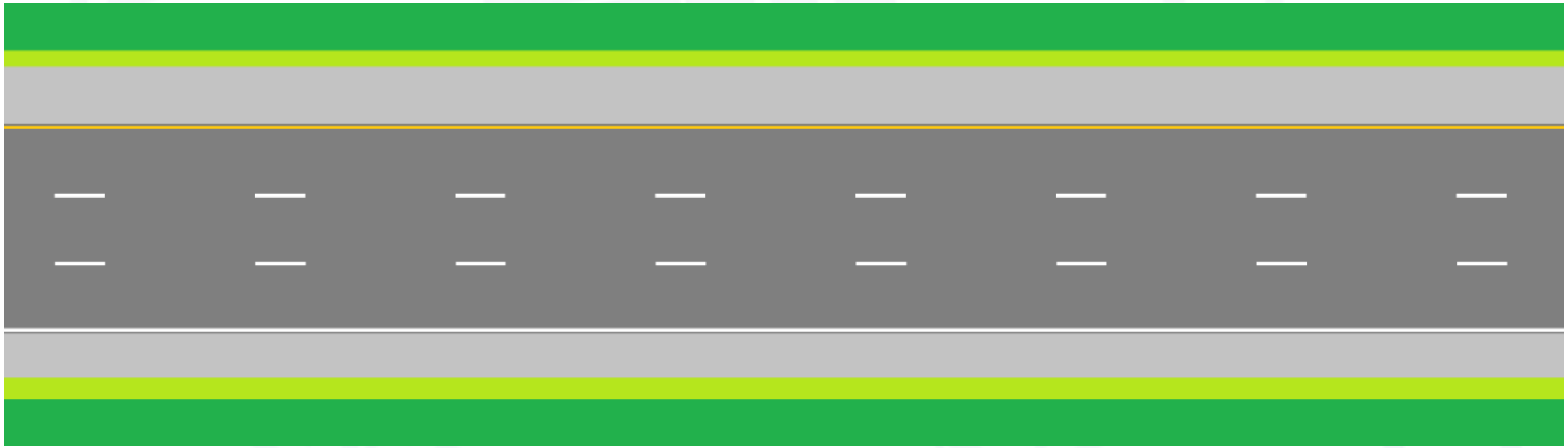
MOT for MOT

What is “MOT for MOT?”

- Short-term temporary traffic control (TTC) needed to install longer term TTC.
- Needed for the initial setup of the MOT Plan or when switching from one phase to another.
- Typically, this work is not addressed by MOT plans.
- Typically, this work is usually left up to the contractor.
- This work can be quite complex even though it is short term, often over a night or two.

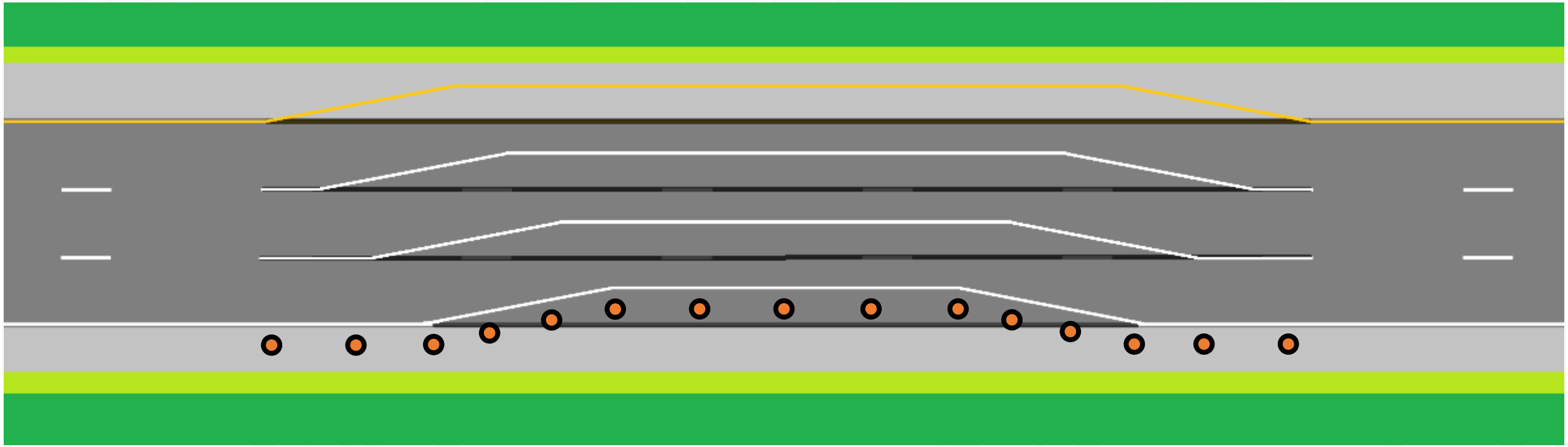
What is “MOT for MOT?”

It’s how we get from a condition like this…



What is “MOT for MOT?”

…to a condition like this



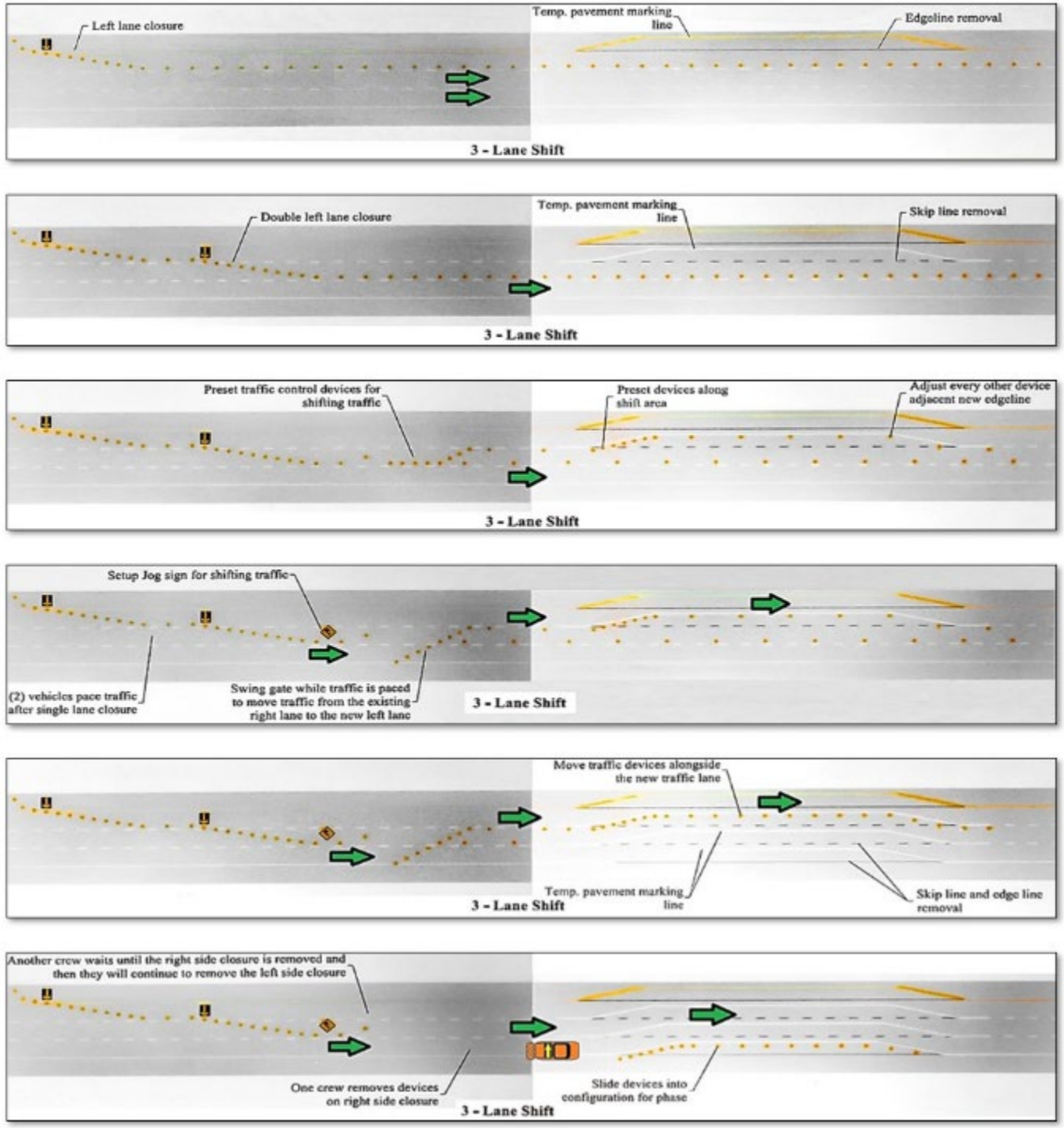
What is MOT for MOT?

- Even though the final product does not have a lane closure, to install the TTC, it will require taking traffic down to 1 lane!

- There are many steps in the process.

NOTE: Tapers are not to scale and not all necessary TTC is shown.

Source of Base Images: Brian Triska



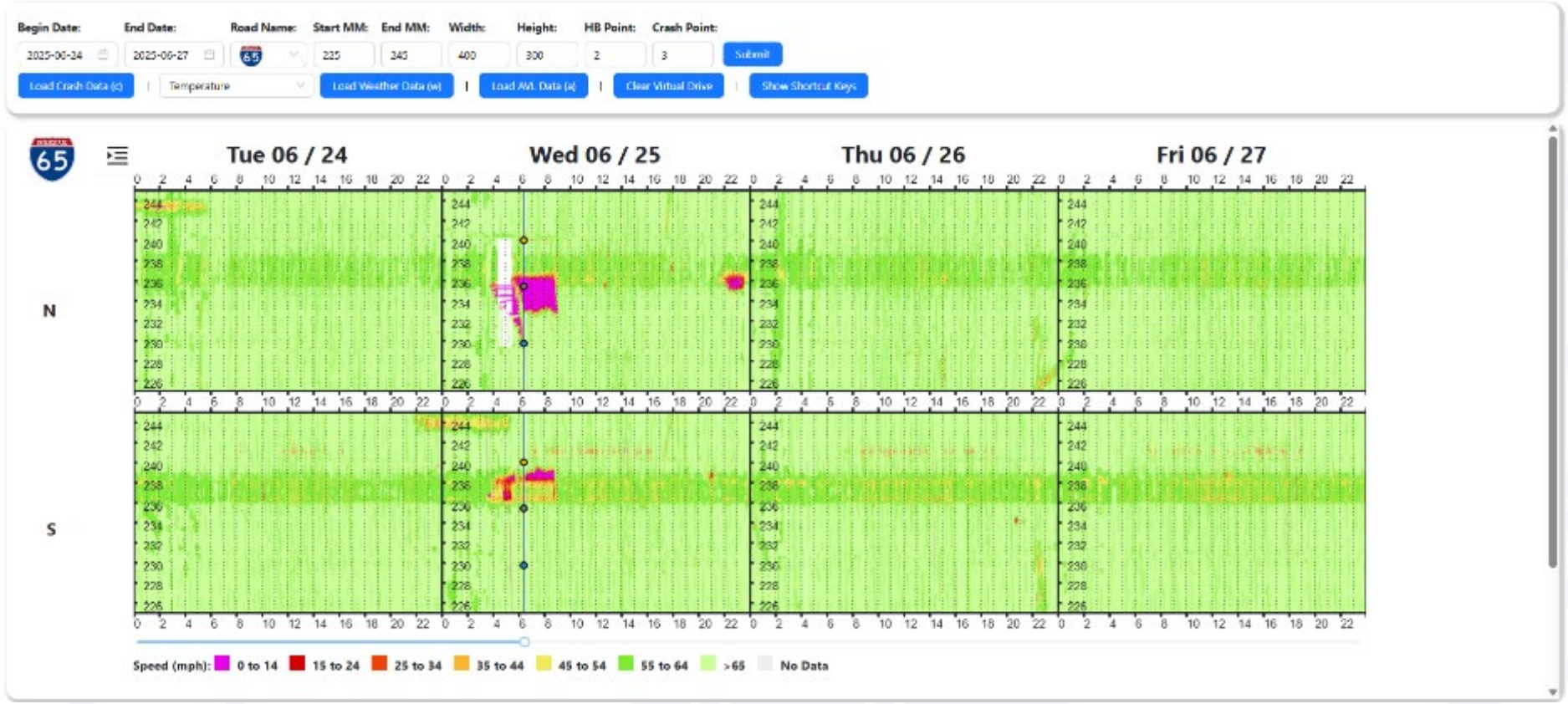
MOT for MOT – Ongoing Discussions and Research

Part of what hopefully comes out of this effort is new guidance that:

1. Identifies **common scenarios and best practices** used by industry and the steps involved in performing setups and phase changes for common scenarios (the "playbook")
2. identifies required **safety measures** that may be lacking or missing in current practice (possibly resolves through strategies in the WZTCG)
3. allows for **better planning** and accounting of components to be considered for inclusion into the pay-items and contract, including:
   a) needed **restrictions** (lane closures, rolling slowdowns or short-term stoppages, ramp closures, etc) and any related IHCP Exceptions needed,
   b) temporary short-term/mobile **traffic control and safety devices** (TMA's, shadow vehicles, PCMS's, etc), and
   c) WZIM planning/Law Enforcement services

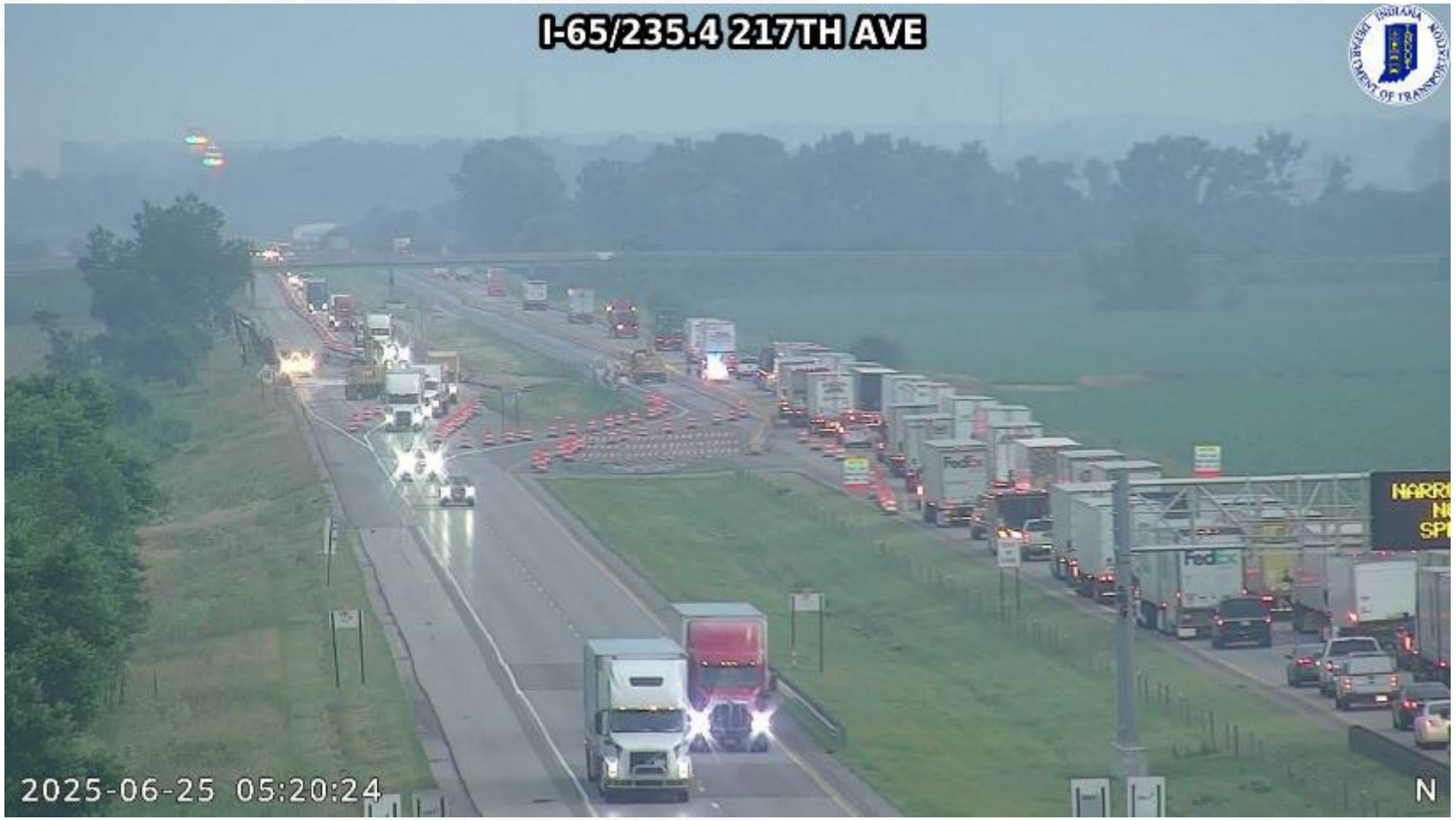
Current Observation

I-65 MM 236 to 238, Purdue Heat Map



June 24 through June 27, 2025

I-65 MM 236 to 238, The Backup



NB I-65, 2025-06-25 (06:21)

I-65 MM 236 to 238, Contributing Circumstance

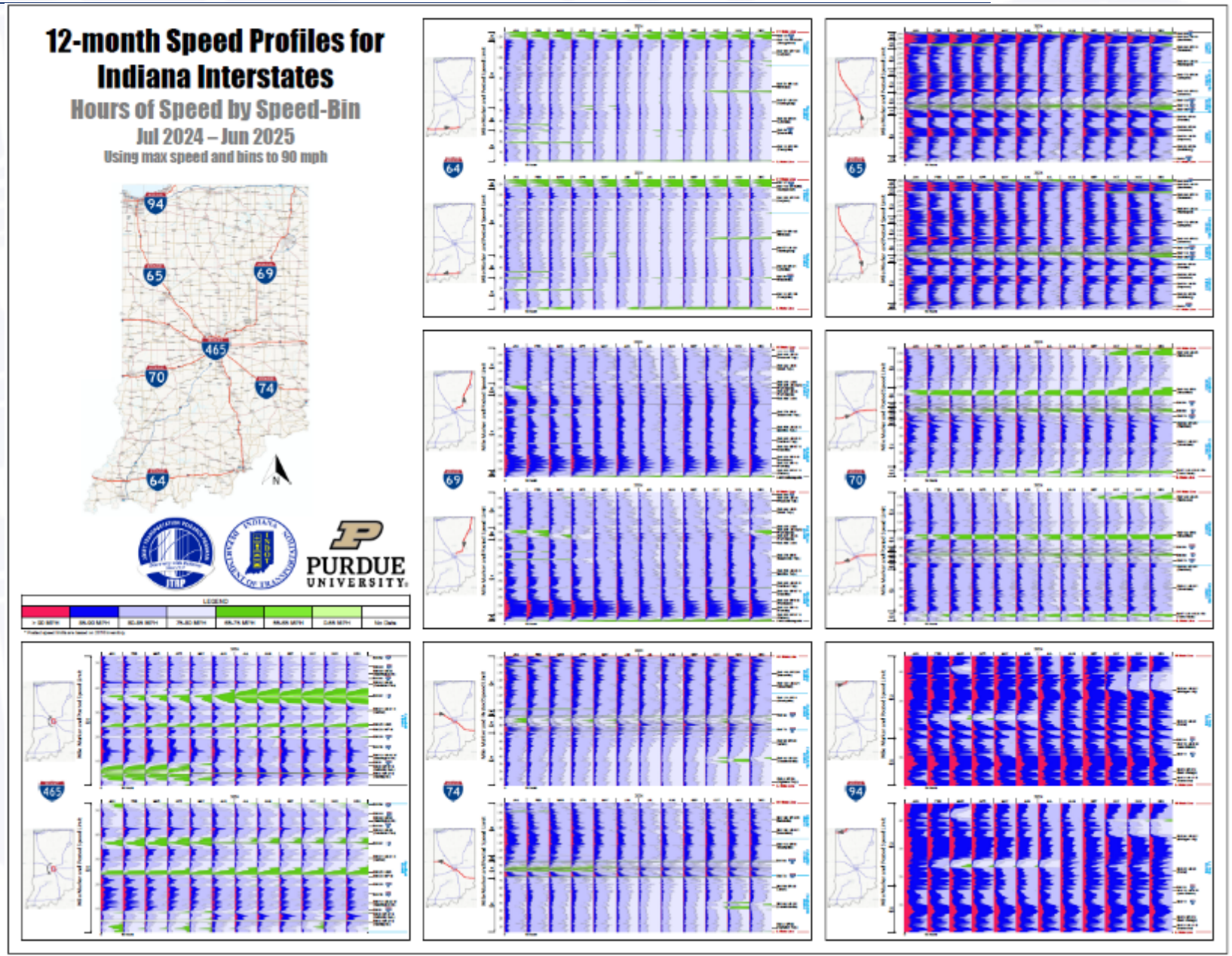
I-65 MM 236-238, Crash on July 6

- Back end of trailer got off pavement
- Impact with rail sheered off rear axles

I-74

Transition Areas: Length of Tapers in Relation to Speed

Interstate Speeds



IDM 503-3.04(03)

503-3.04(03) Transition Taper Rate and Longitudinal Buffer Spaces [Rev. May 2023]

1. Merge and shift tapers. The most important element in the transition area is the taper that provides channelization. Reference IDM Figure 503-7D and 503-7E for the types of lane tapers. An inadequate or excessively long taper length produces undesirable traffic operations, which could lead to crashes within the work area. A merging taper is used on multilane roadways when the number of traffic lanes is reduced. The length of the merging taper should be long enough for vehicles traveling side-by-side to adjust their speeds and merge into a single lane before the end of the transition.

   The table in INDOT Standard Drawing 801-TCDV-03; provides minimum taper lengths based on speed and either the width of the lane or the shift. The standard initial merge taper length for all interstate and freeway projects will be based on 70 mph regardless of the permanently posted speed limit. This change recognizes that in urban areas operating speeds significantly exceed the posted speed limit on a regular basis. Subsequent merges will also be based on 70 mph speeds unless a variation is deemed appropriate. If a shorter merge taper length will be used it should be based on a lower prevailing operating speed at the location and the decision should be documented with a level 2 design exception. Following the same reasoning interstate and freeway shift taper lengths for a full 12 ft shift should be 420 ft. For other highways the permanently posted speed limit in advance of the construction zone should be used to determine the needed length. Should the average operating speeds be greater than 70 mph (freeways) or the posted speed limit (non-freeways) that speed should be used as the basis for the taper length.

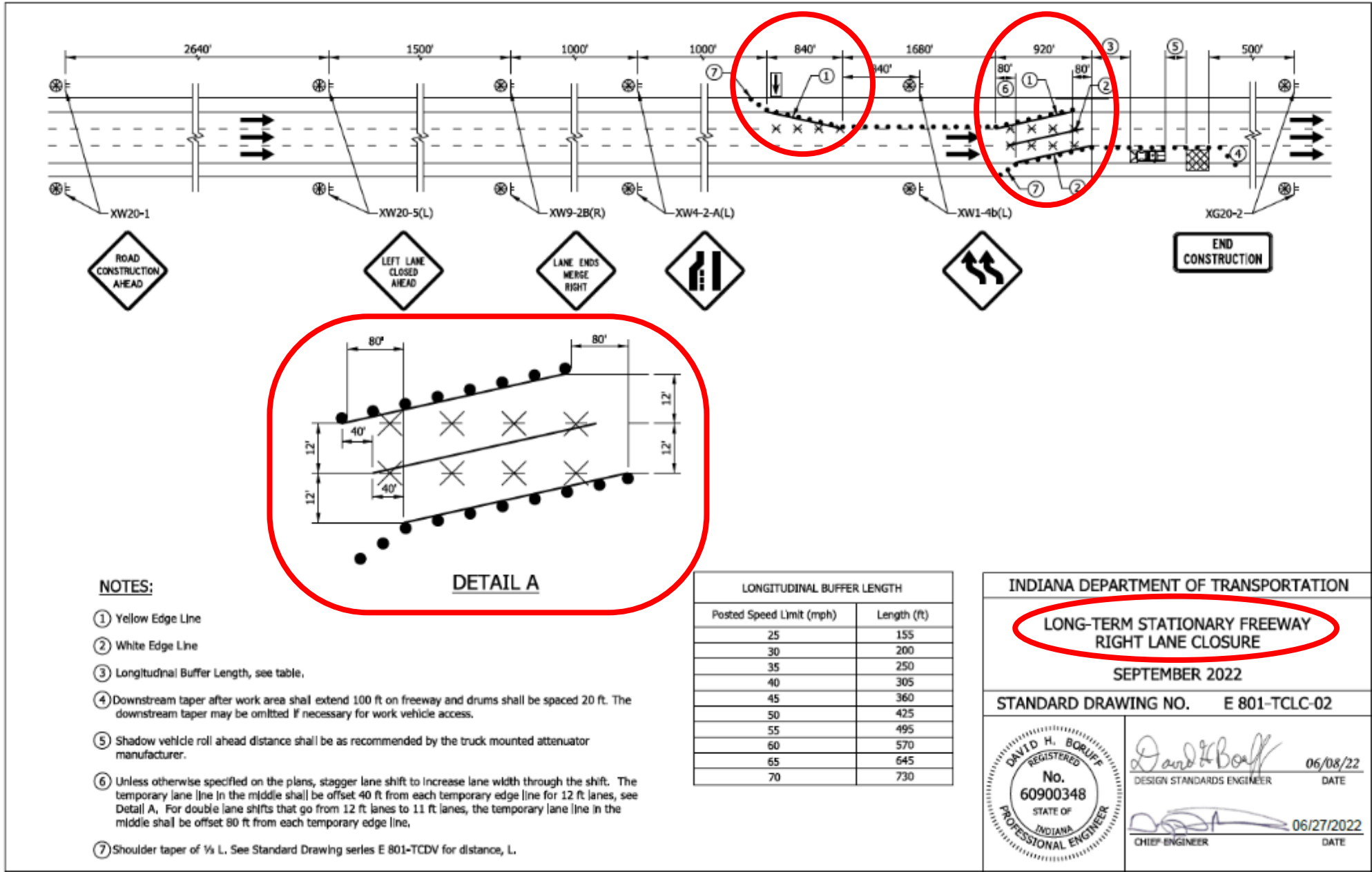
   Longer tapers should be considered when truck volumes are high. In those situations, consideration should be given to taper lengths that are based on a speed that is at least 10 mph greater than the normal posted speed of the highway, particularly for the first taper encountered since large trucks require greater distances to adjust their speed and maneuver safely. The taper should be placed well in advance of temporary traffic barriers. This practice not only provides for a safer work zone, but also helps construction traffic to safely access the work zone.

   Lane shift and shoulder closure tapers should be based on the same speeds as lane merge tapers. Shoulder closure tapers should be provided for any shoulder closure and when the adjacent travel lane is closed and should be calculated as 1/3 L.

2. Staggering Shifts of Multiple Lanes. Another strategy that is required for interstates and freeways and should be considered for other multi-lane highways is to offset tapers of multi lane shifts to increase the lane width through the shift movement. This is accomplished by staggering the starting point of temporary longitudinal pavement marking edge and lane lines. See Figure 503-3J for a depiction, the Standards (801-TCLC) contain the requirement for interstates and freeways. The staggered shift method provides wider lane widths. For instance, with a 40 ft stagger from the beginning point of each temporary pavement marking line to line (edge line to lane line to lane line etc.), 12' interstate lanes transition into 14' lanes entering the taper and again to 12 ft lanes after the shift. Where the lane width is to be reduced from 12' entering the shift to 11' after the shift the stagger from the beginning of temporary line to line should be 80 ft. This treatment enhances operation and safety particularly for large trucks.

3. Longitudinal Buffer Spaces. Table 6C-2 in the IMUTCD provides "Stopping Sight Distance as a Function of Speed" and should be used as minimum Longitudinal Buffer Space Lengths. Longitudinal Buffer Space is required for interstate and freeway lane closures by INDOT Standards. For other highways these buffer spaces should be provided whenever practical and shall be provided for all first merges and shifts transitioning into work zones where longer tapers described in this the preceding paragraphs are deemed necessary

Standard Drawings 801-TCLC Series



NOTES:

1. Yellow Edge Line
2. White Edge Line
3. Longitudinal Buffer Length, see table.
4. Downstream taper after work area shall extend 100 ft on freeway and drums shall be spaced 20 ft. The downstream taper may be omitted if necessary for work vehicle access.
5. Shadow vehicle roll ahead distance shall be as recommended by the truck mounted attenuator manufacturer.
6. Unless otherwise specified on the plans, stagger lane shift to increase lane width through the shift. The temporary lane line in the middle shall be offset 40 ft from each temporary edge line for 12 ft lanes, see Detail A. For double lane shifts that go from 12 ft lanes to 11 ft lanes, the temporary lane line in the middle shall be offset 80 ft from each temporary edge line.
7. Shoulder taper of ⅓ L. See Standard Drawing series E 801-TCDV for distance, L.

LONGITUDINAL BUFFER LENGTH	
Posted Speed Limit (mph)	Length (ft)
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

INDIANA DEPARTMENT OF TRANSPORTATION

LONG-TERM STATIONARY FREEWAY RIGHT LANE CLOSURE

SEPTEMBER 2022

STANDARD DRAWING NO. E 801-TCLC-02

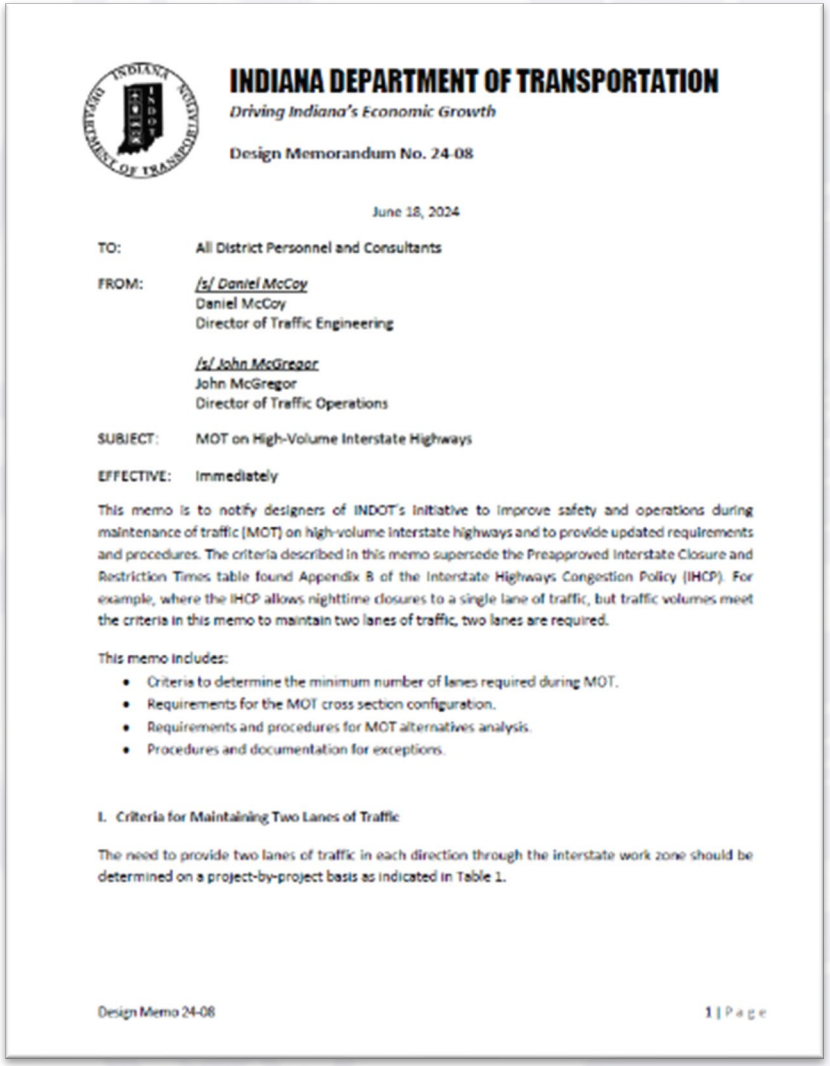
DAVID H. BORUFF REGISTERED No. 60900348 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER — 06/08/22 DATE

CHIEF ENGINEER — 06/27/2022 DATE

Early Work Zone Strategy Selection

DM 24-08



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 24-08

June 18, 2024

TO: All District Personnel and Consultants

FROM: */s/ Daniel McCoy*
Daniel McCoy
Director of Traffic Engineering

/s/ John McGregor
John McGregor
Director of Traffic Operations

SUBJECT: MOT on High-Volume Interstate Highways

EFFECTIVE: Immediately

This memo is to notify designers of INDOT's initiative to improve safety and operations during maintenance of traffic (MOT) on high-volume interstate highways and to provide updated requirements and procedures. The criteria described in this memo supersede the Preapproved Interstate Closure and Restriction Times table found Appendix B of the Interstate Highways Congestion Policy (IHCP). For example, where the IHCP allows nighttime closures to a single lane of traffic, but traffic volumes meet the criteria in this memo to maintain two lanes of traffic, two lanes are required.

This memo includes:

- Criteria to determine the minimum number of lanes required during MOT.
- Requirements for the MOT cross section configuration.
- Requirements and procedures for MOT alternatives analysis.
- Procedures and documentation for exceptions.

I. Criteria for Maintaining Two Lanes of Traffic

The need to provide two lanes of traffic in each direction through the interstate work zone should be determined on a project-by-project basis as indicated in Table 1.

Design Memo 24-08 1 | Page

This memo includes:

- Criteria to determine the minimum number of lanes required during MOT.
- Requirements for the MOT cross section configuration.
- Requirements and procedures for MOT alternatives analysis.
- Procedures and documentation for exceptions.

DM 24-08

If the Peak Hour Volume % is... (1)	and Daily Vehicular Volume (total) is at least...	...Or Daily Truck Volume (total) is at least...	Then...
Any	30,000	10,000	**Two lanes are required in each direction.** (2)
7%	26,000	8,000	
8%	23,000	7,000	
9%	20,500	6,500	
≥ 10%	18,500	6,000	

(1) Design Hourly Volume (DHV) percentage from the Traffic Forecast Report can be used.

(2) A determination for the minimum number of lanes is required when the peak hour volume exceeds 1,800 vph for a short duration, e.g., 1 or 2 hours.

Table 1 - Minimum Thresholds Requiring Two Lanes

DM 24-08 REQUIREMENTS

A. Alternatives Analysis for MOT

An MOT alternatives analysis should include the following:

1. Traffic analysis with a recent full 7-day traffic count or other approved data as a proxy. The extended traffic data will allow for the proper identification of the controlling time period for peak flow analysis under the MOT conditions.

2. Costs to provide the following:

a. Two lanes of traffic in the current direction. Include separate costs for providing the preferred roadway cross section as well as Options 2 and 3 in the cross section elements hierarchy.

b. A 3-and-1 contraflow layout.

c. An alternate that requires an exception, if applicable.

3. A review of historical safety and mobility performance during similar construction activities on the corridor and documentation of the findings.

4. Recommendation of a preferred alternative.

DM 24-08 REQUIREMENTS

Cross Section Elements

The cross section for MOT should be determined using the following hierarchy:

Option[3]	Cross Section Configuration[4][5]	Shoulder Width	Comments
1	2 lanes @ 12 ft	2 ft	Preferred option. May require temporary widening.
2	1 lane @ 12 ft[1], and 1 lane @ 11 ft	2 ft	Analysis must show physical constraints result in additional construction that is prohibitive due to cost or time. Review of crash history[2].
3	2 lanes @ 11 ft	2 ft	Savings in time and cost over option 2 must be demonstrated.

IHCP Approving Authority, WZ Council, WZ Review Board…

Duration	Description	Exception Submittal Requirements	Determination Made By…
Short Term	During lower volume periods, maintaining a single lane may not produce queuing.	Queue Analysis demonstrating no queue during restriction.	IHCP Approving Authority
1 - 14 days	Continuous restriction up to 14 days.	Request should include justification for why the restriction is reasonable and prudent, an MOT alternatives analysis, and a user cost analysis.	IHCP Approving Authority (Possible escalation to Work Zone Council)
15 - 30 days	Continuous restriction from 15 to 30 days. (Greater justification needed)	Request should include the same as 1 - 14 days duration with mitigation strategies for the proposed MOT alternative.	Work Zone Council
> 30 days	Continuous restriction greater than 30 days. (This duration is discouraged and will be considered only in rare circumstances.)	Request should include the same as ≤ 30 days duration with a full description of the unique circumstances warranting a longer duration.	Work Zone Review Board & INDOT Chief Engineer of Construction

Table 4 – Exceptions by Phase Duration.

These decisions, although documented here as a design consideration, can affect cost substantially and should be largely resolved during the scoping phase.

Engineering Assessment Manual

3-3.05(02) Maintenance of Traffic Plan
Engineering Assessment Level: Both (Non-complex and Complex)

The Maintenance of Traffic (MOT) Plan is an integral part of the project scope, and critical to the development of a cost estimate that accurately reflects the project's financial requirements. Do not defer selection of a conceptual maintenance of traffic plan until the design phase of the project, as the maintenance of traffic plan may add significant cost to a project. The Scoping Engineer should ensure that the initial MOT plan considers and balances worker safety as well as IHCP minimum lane requirements (where applicable). In developing a project scope, the Scoping Engineer has the following requirements relative to the Maintenance of Traffic Plan:

The Designer should evaluate the maintenance of traffic concept provided in the engineering assessment document to ensure relevance and completeness prior to developing the final maintenance of traffic plan.

These decisions, although documented here as a design consideration, can affect cost substantially and should be largely resolved during the scoping phase.

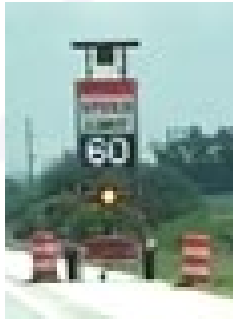
Work Zone Selection is critical to cost and must be determined during scoping.

Digital Temporary Worksite Speed Limit Sign Assemblies

Digital TWSLSA Advance Warning

- Digital Speed Limits, not Variable Speed Limits
- Variable Speed Limits are defined by Indiana Code

Digital TWSLSA with Warning Lights



Is this a continuous or intermittent TWSLSA? (CM 14-06)
Intermittent requires flashing strobes and a WHEN FLASHING plaque.
Continuous has neither flashing lights nor plaque.

Combo Digital TWSLSA & Speed Feedback

No warning lights.

Right side missing WORKSITE plaque.

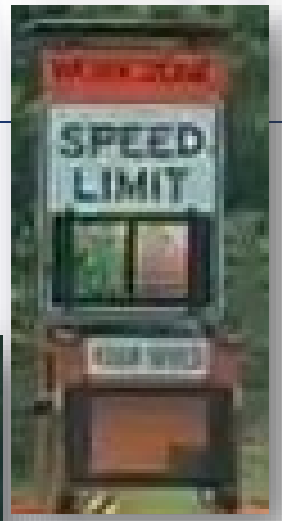
What happens if only top display malfunctions?

Separate Speed Limit from feedback display?

Display Malfunction

Intent was to have 45 MPH thru worksite.

No speed limit drop due malfunction.



Resumption of Existing Speed Limit within WZ

Speeds allowed to resume to normal between worksites within work zone.

Digital TWSLSA after END CONSTRUCTION

Need for Digital TWSLSA here?

WORKSITE plaque not appropriate after work zone.

Warning lights -- intermittent or continuous?

Crawfordsville District is the Leader…

- Open Discussion