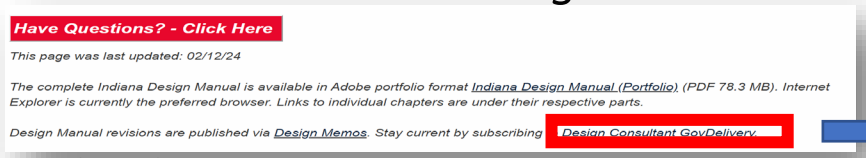
Policy Updates

Katherine Smutzer, PE, INDOT Work Zone Safety Engineer
Dan McCoy, PE, INDOT Traffic Engineering Director
Pete White, PE, INDOT Bridge Design Manager

2024 INDOT Bridge Design Conference

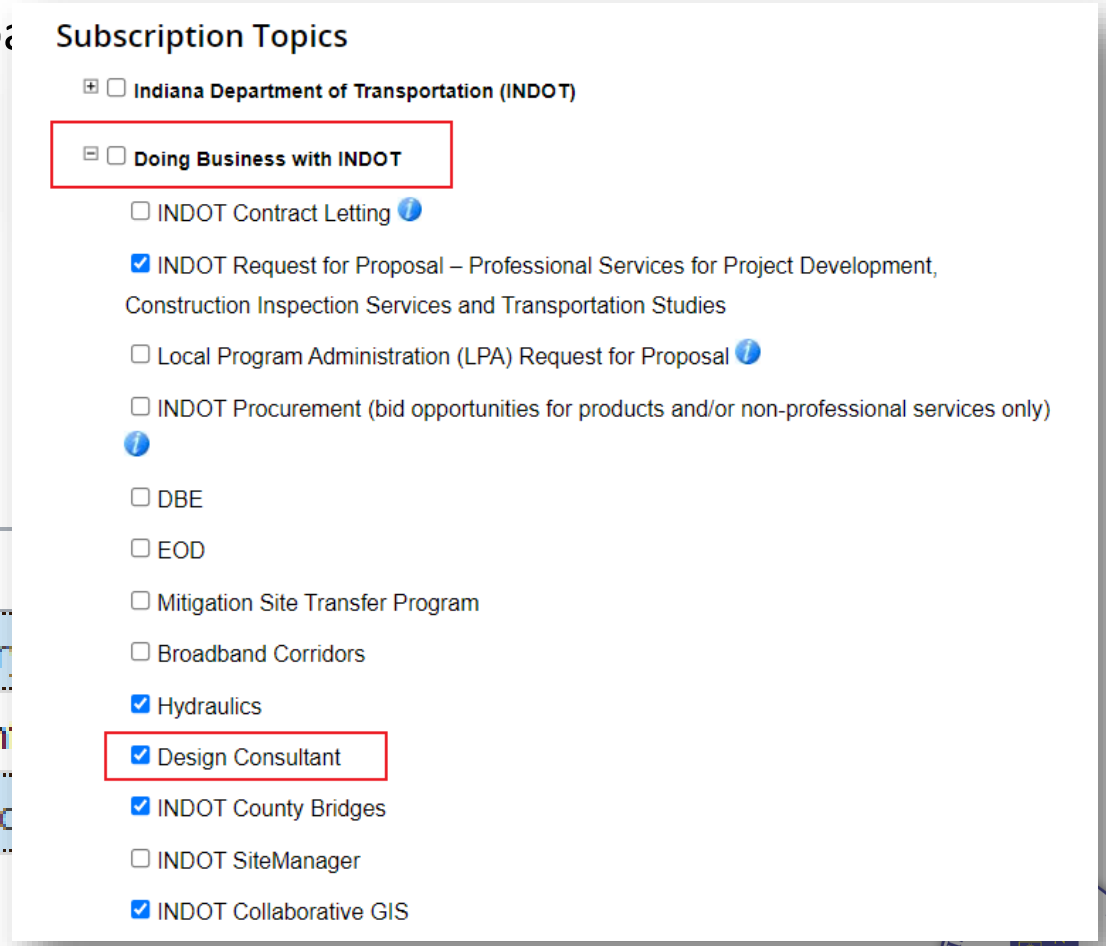
Information and Communication

- Design Consultant Listserv → Gov Delivery [INDOT Design Consultants]
  - link available from *Indiana Design Manual* webpa



  - Communication
    - Design Memos - changes to design policies,
    - Bridge Design Aids
    - Training opportunities, surveys

From	Subject
INDOT Design Consultants	Design Memo for Februar
INDOT Design Consultants	INDOT Bridge Design Con
Indiana Department of Transportation	Correction - Design Memo



DM 23-07 Guardrail End Treatments

DM 23-17 Placing and Terminating Temporary Traffic Barrier

Katherine Smutzer, PE

INDOT Work Zone Safety

DM 23-17 Placing and Terminating TTB

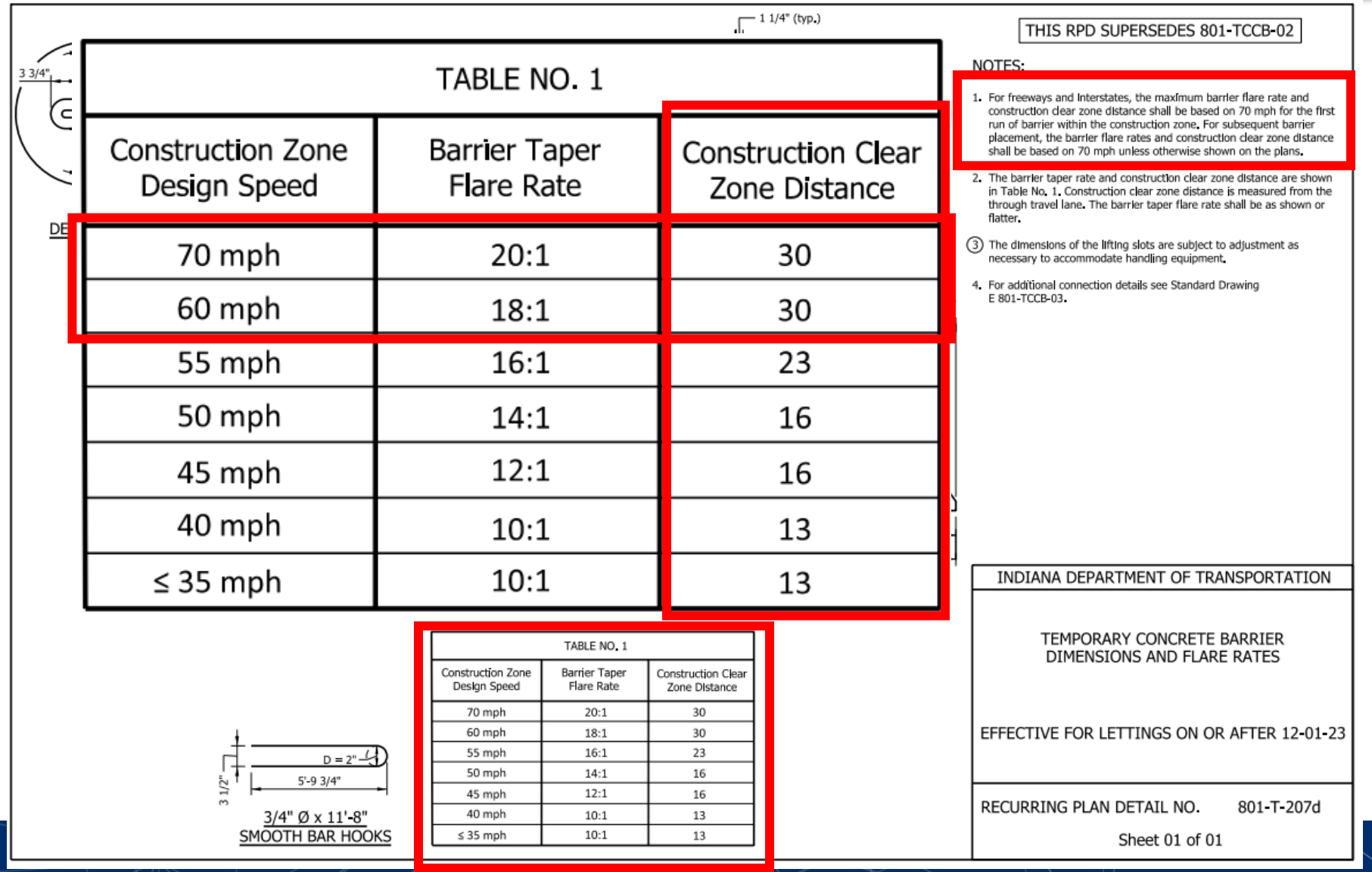
- New Recurring Special Provision (RSP) and Recurring Plan Detail (RPD)
- 801-T-207, TEMPORARY TRAFFIC BARRIERS
- 801-T-207d, TEMPORARY TRAFFIC BARRIERS DIMENSIONS AND FLARE RATES
  - Will be sunset and incorporated into 2024 Standard Drawings
- Both the RSP and the RPD have the same, Basis for Use: **Required for all contracts with any Temporary Traffic Barrier pay item.**

Division 800 - Traffic Control Devices and Lighting

RSP or RPD	Description	Rev. Date*	Letting Date**
801-T-207	Temporary Traffic Barriers	07/20/23	12/01/23
801-T-207d	Temporary Traffic Barriers Dimensions and Flare Rates	07/20/23	12/01/23

Will be included with projects that let on or after 12/01/2023

Placing and Terminating TTB



1 1/4" (typ.)

3 3/4"

TABLE NO. 1

Construction Zone Design Speed	Barrier Taper Flare Rate	Construction Clear Zone Distance
70 mph	20:1	30
60 mph	18:1	30
55 mph	16:1	23
50 mph	14:1	16
45 mph	12:1	16
40 mph	10:1	13
≤ 35 mph	10:1	13

THIS RPD SUPERSEDES 801-TCCB-02

NOTES:

1. For freeways and Interstates, the maximum barrier flare rate and construction clear zone distance shall be based on 70 mph for the first run of barrier within the construction zone. For subsequent barrier placement, the barrier flare rates and construction clear zone distance shall be based on 70 mph unless otherwise shown on the plans.
2. The barrier taper rate and construction clear zone distance are shown in Table No. 1. Construction clear zone distance is measured from the through travel lane. The barrier taper flare rate shall be as shown or flatter.
3. The dimensions of the lifting slots are subject to adjustment as necessary to accommodate handling equipment.
4. For additional connection details see Standard Drawing E 801-TCCB-03.

INDIANA DEPARTMENT OF TRANSPORTATION

TEMPORARY CONCRETE BARRIER DIMENSIONS AND FLARE RATES

EFFECTIVE FOR LETTINGS ON OR AFTER 12-01-23

RECURRING PLAN DETAIL NO. 801-T-207d

Sheet 01 of 01

D = 2"

5'-9 3/4"

3 1/2"

3/4" Ø x 11'-8" SMOOTH BAR HOOKS

TABLE NO. 1

Construction Zone Design Speed	Barrier Taper Flare Rate	Construction Clear Zone Distance
70 mph	20:1	30
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50 mph	14:1	16
45 mph	12:1	16
40 mph	10:1	13
≤ 35 mph	10:1	13

Placing and Terminating TTB

RSP 801-T-207, TEMPORARY TRAFFIC BARRIERS

(a) Placement

Temp
barriers u
regulator
cannot be
minimum
traffic ba
alignment
rates for
or where
the edge
plans ma

12-01-23

801-T-207 TEMPORARY TRAFFIC BARRIERS

(Revised 07-20-23)

The Standard Specifications are revised as follows:

SECTION 108, BEGIN LINE 211, DELETE AND INSERT AS FOLLOWS:

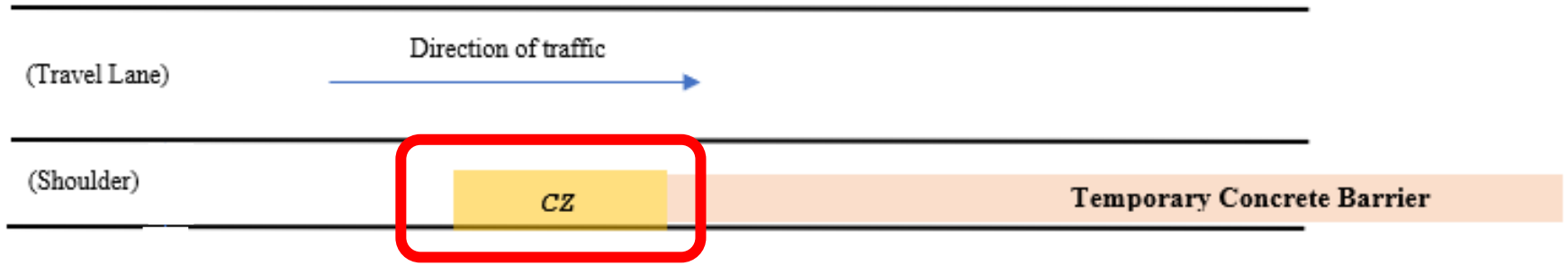
Temporary drainage structures, temporary ~~concrete median~~*traffic* barriers~~,~~ and other temporary devices required and used for the maintenance of traffic shall remain the property of the Contractor. All costs for furnishing, placing, maintaining, removal, and disposal of temporary drainage structures shall be included in the contract lump sum price for maintaining traffic. If there is no pay item for maintaining traffic, these costs shall be included in the various pay items listed in the proposal, unless otherwise provided.

emporary traffic
or the applicable
quired flare rate
rate with a 20 ft
flared temporary
ed, the tapered
um offset. Flare
closed to traffic
mum offset from
se shown on the

Placing and Terminating TTB

1. The approaching end of TTB placed within the construction clear zone must be terminated with a construction zone energy absorbing terminal (CZ). Construction clear zone is shown on RPD 801-T-207d.

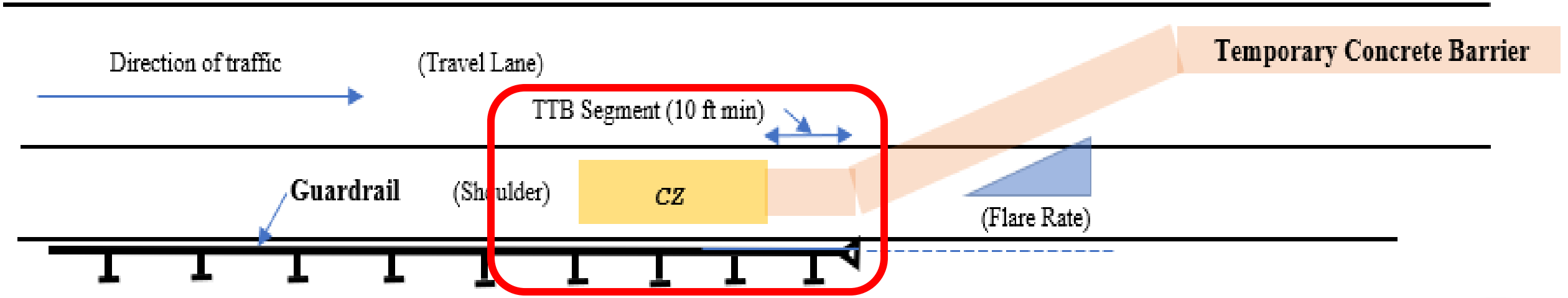
Placement Conditions: TTB flared inside construction clear zone



Placing and Terminating TTB

2. The CZ must be placed parallel to approaching traffic or the best alignment practical.

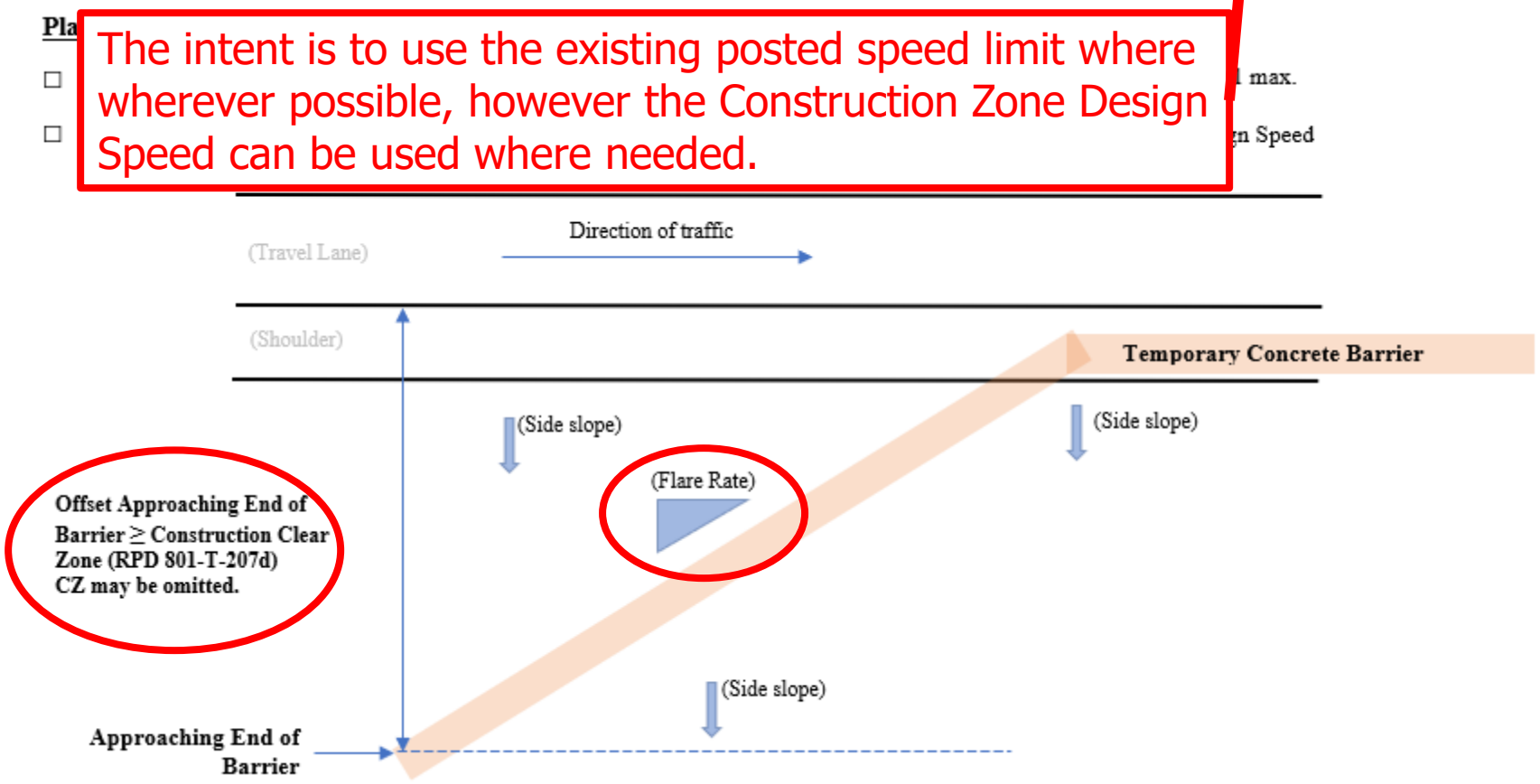
3. The TTB segment immediately downstream of a CZ unit must be parallel to the CZ unit.



Placing and Terminating TTB

4. Flare rates are determined by construction zone design speed. Flare rates are shown on RPD 801-T-207d. For interstates and freeways, the first run of barrier within the construction zone must use of 70 mph on for flare rate and construction clear zone distance.

The intent is to use the existing posted speed limit where wherever possible, however the Construction Zone Design Speed can be used where needed.



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50 mph	14:1	16
45 mph	12:1	16
40 mph	10:1	13
≤ 35 mph	10:1	13

Revised Table from 801-T-207d

Placing and Terminating TTB

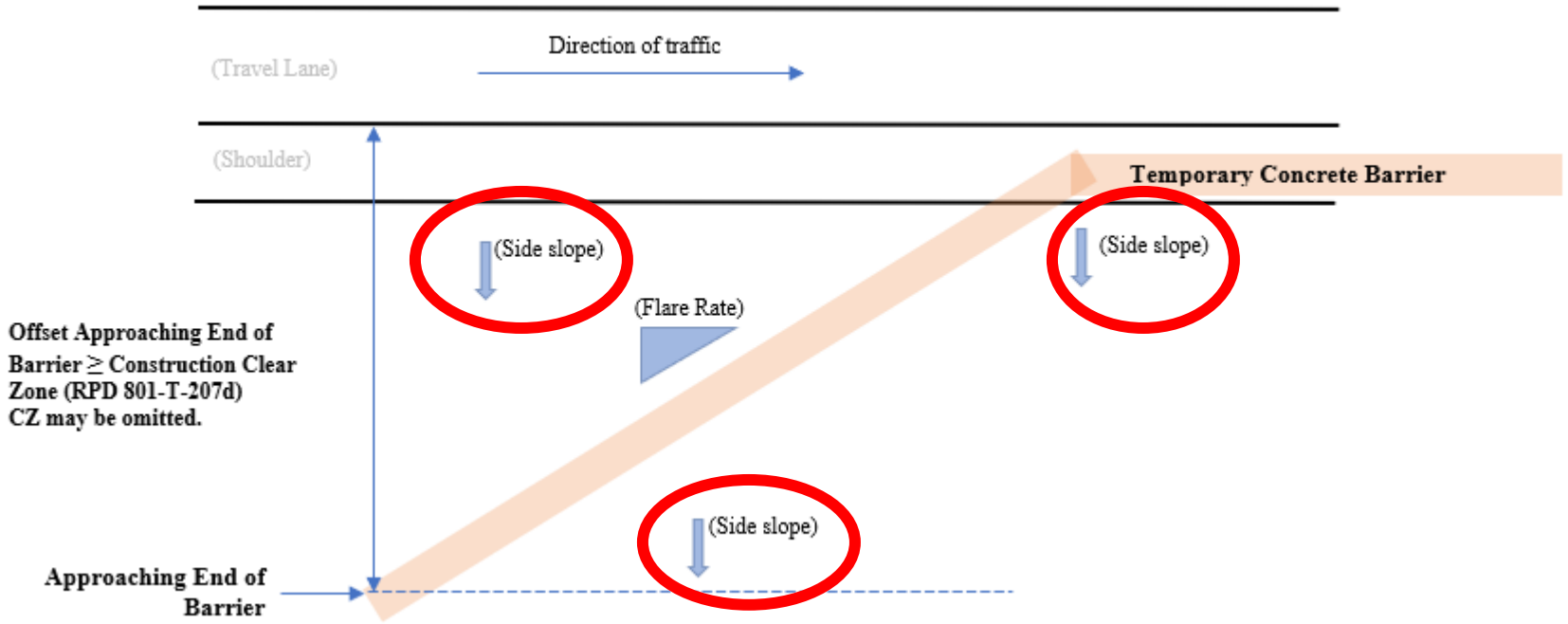
5. Cross slope/side slope leading to and on which the TTB is placed must be as follows, otherwise, place parallel to approaching traffic.

a. 10:1 or flatter along interstates and freeways.

b. 4:1 or flatter on all other roadways.

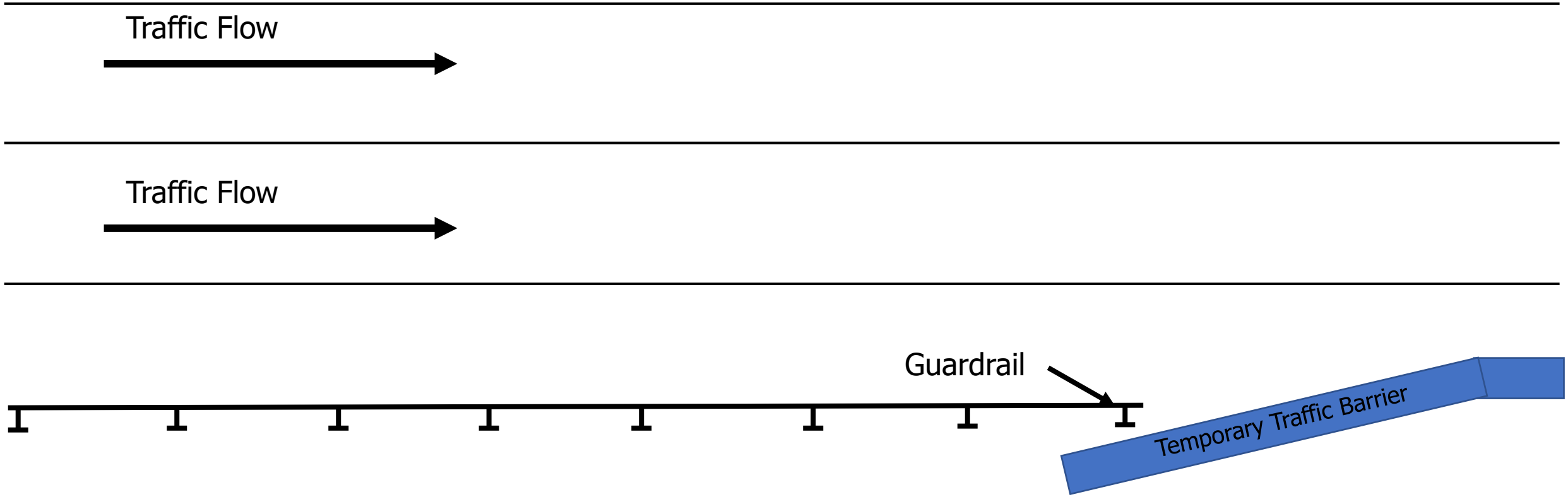
For Interstates or Freeways

For Roadways other than Freeways or Interstates



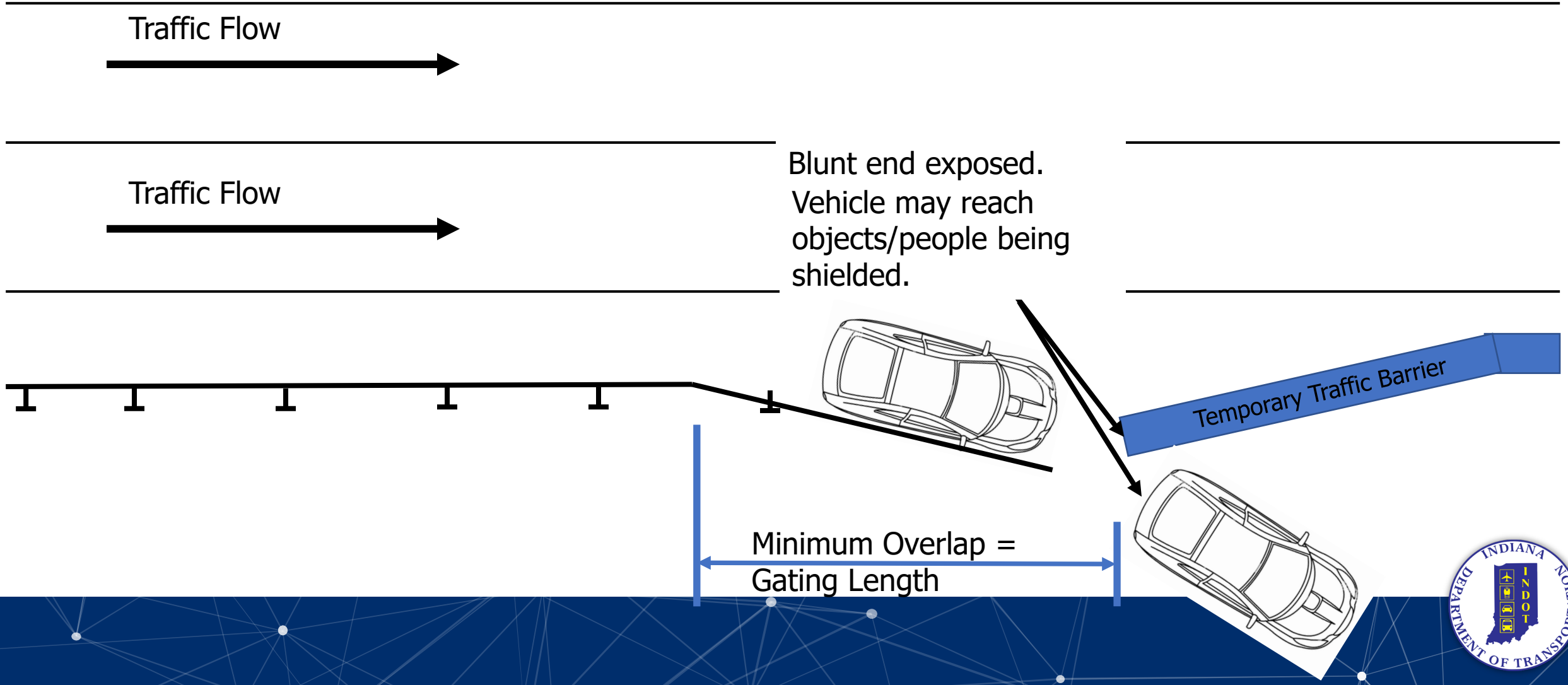
Placing and Terminating TTB

- Why set a minimum overlap length?



Placing and Terminating TTB

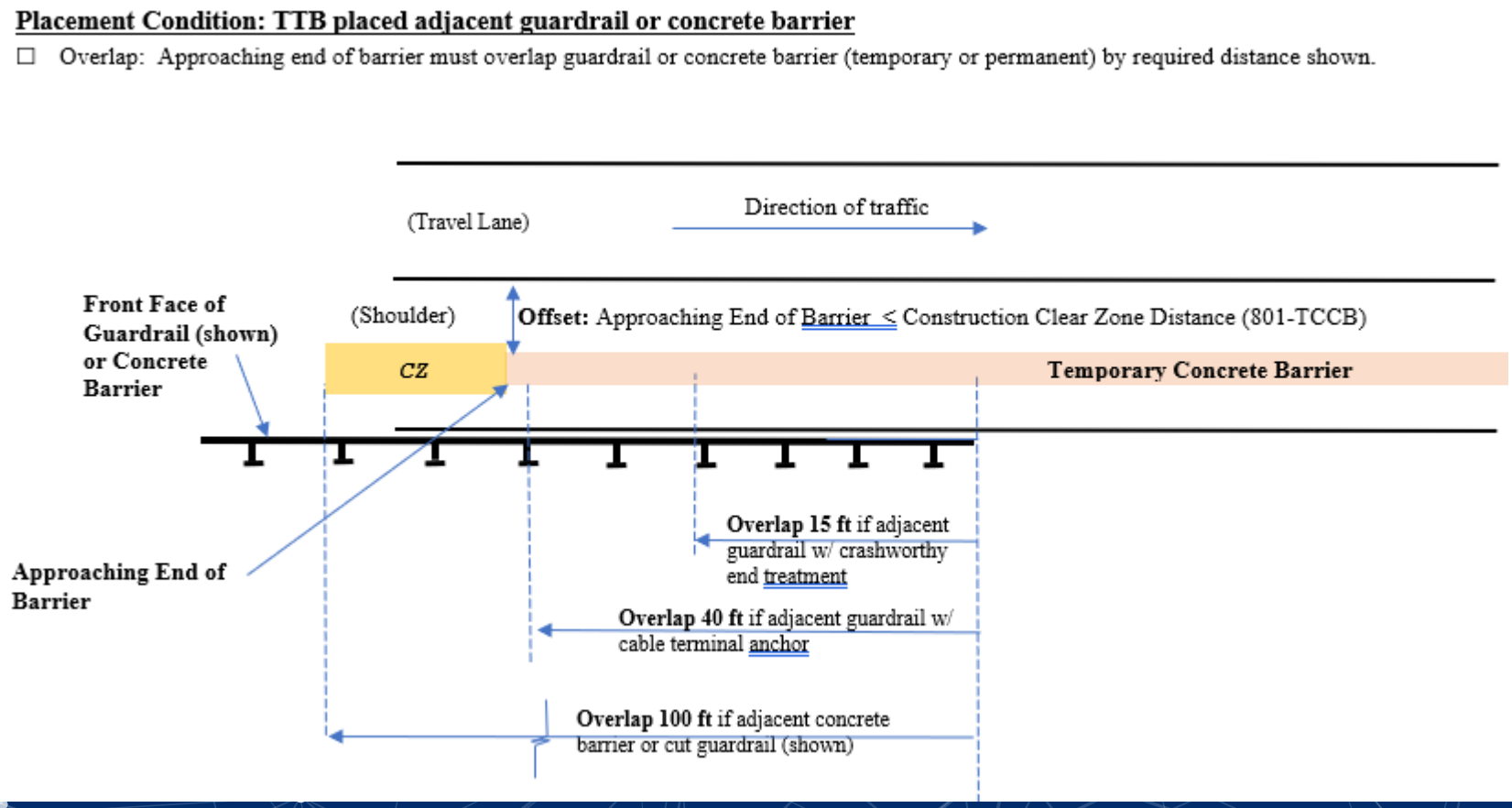
- Overlap distance set based on gating and deflection



Placing and Terminating TTB

6. TTB placed adjacent the front face of guardrail or concrete barrier (temporary or permanent) must meet the following.

a. The approaching end of the temporary traffic barrier must be terminated with a CZ unit

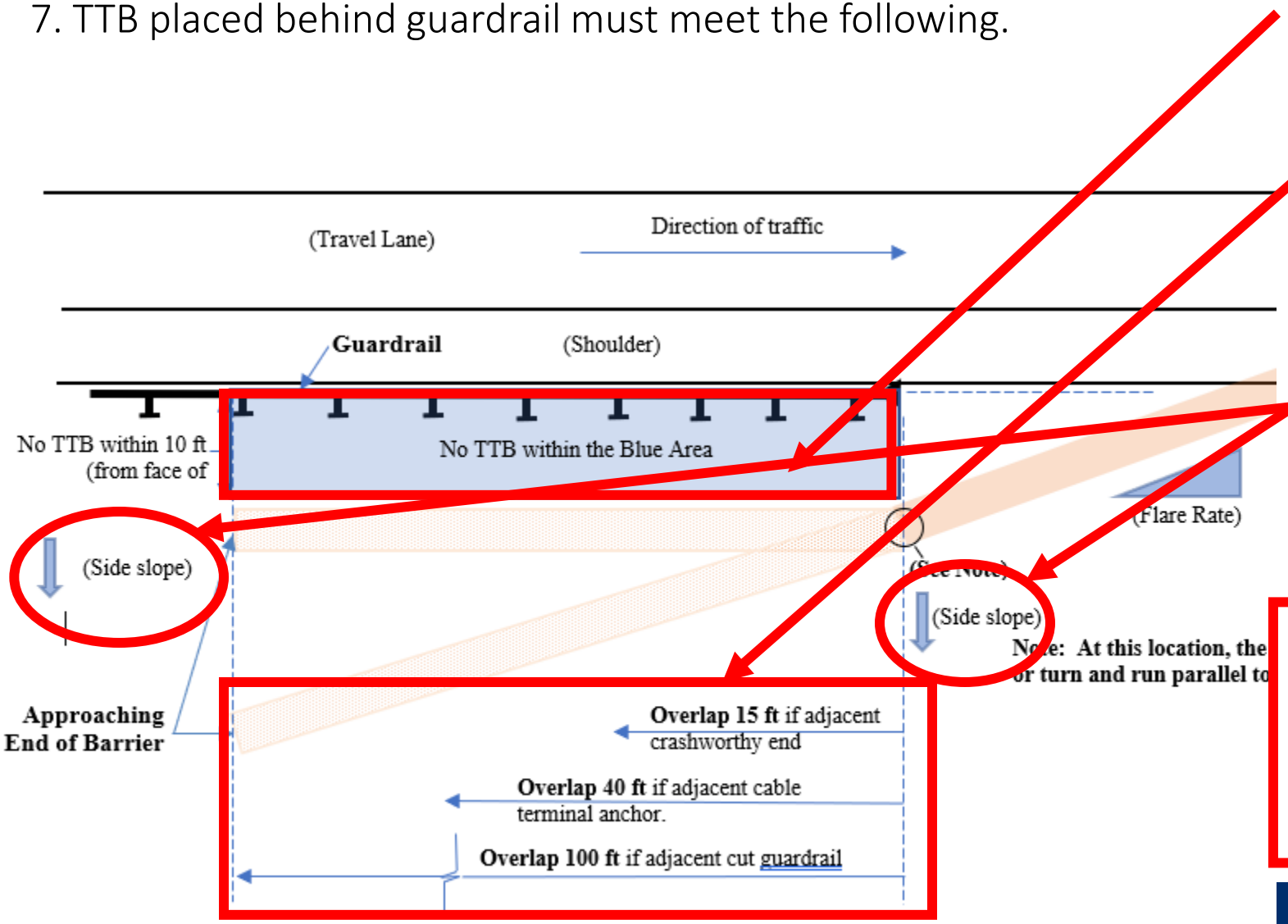


b. The temporary traffic barrier must overlap the permanent or temporary roadside barrier as follows:

1) 15 ft if adjacent guardrail terminated with a crashworthy end treatment.
2) 40 ft if adjacent guardrail terminated with a cable terminal anchor.
3) 100 ft if adjacent concrete barrier or cut guardrail.

Placing and Terminating TTB

7. TTB placed behind guardrail must meet the following.



a. No portion of the barrier may be within 10 ft of the guardrail front face.

b. The approach end of the temporary traffic barrier must overlap a minimum distance beyond the end of the guardrail.

c. The slopes leading to and on which the barrier is placed must meet the cross slope/side slope criteria.

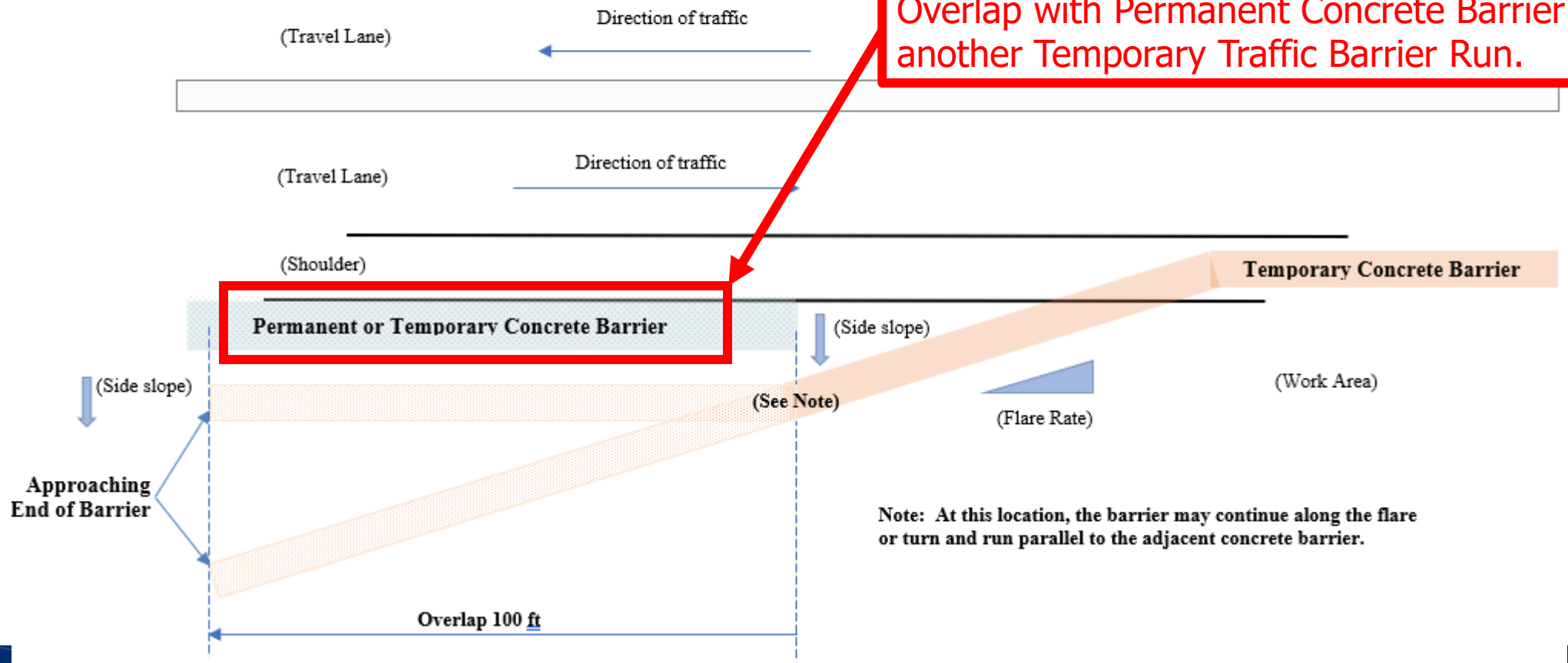
d. Where all the above criteria cannot be met, the guardrail must be placed adjacent the face of the permanent or temporary roadside safety barrier.

Placing and Terminating TTB

Placement Conditions: TTB adjacent concrete barrier

- ☐ Side Slope: (Freeway/Interstate) Side slope on approach and under barrier must be 10:1 or flatter. Other roadways 4:1 max.
- ☐ Flare Rate: Barrier flare rate must be equal to or flatter than the required flare rate based on Construction Zone Design Speed
- ☐ Overlap: Approaching end of the barrier must overlap concrete barrier by 100 ft.

Overlap with Permanent Concrete Barrier Wall or another Temporary Traffic Barrier Run.



Placing and Terminating TTB

801.10.1 Construction Zone Energy Absorbing Terminal, CZ

The construction zone energy absorbing terminal, CZ, shall ~~have passed NCHRP 350 level 3 crash test~~ *meet the test level 3 NCHRP 350 or MASH crash test criteria* for all Interstate and other construction sites having a ~~construction zone~~ *regulatory* speed limit *prior to construction* in excess of 45 mph. ~~and level 2~~ *The CZ shall meet test level 2* for non-Interstate construction sites having a *regulatory speed limit prior to* construction ~~zone speed limit~~ of 45 mph or less. ~~All energy absorbing terminal, CZ, shall have redirect capabilities and shall be approved by the FHWA~~

All energy absorbing terminal, CZ, shall have redirect capabilities. A copy of the crash test report confirming the product is NCHRP 350 or MASH compliant for the test level specified, or a copy of the FHWA eligibility letter, shall be furnished to the Engineer prior to the installation of the unit.

When selecting the CZ unit test level, it should be based on the regulatory speed limit.

Placing and Terminating TTB

What Designers must detail on the plans:

1. Minimum overlap of TTB with other permanent or temporary roadside barrier.
2. TTB flare rate.
3. Side slope on which the TTB will be placed.
4. CZ unit with appropriate test level (TL-2 or TL-3), in appropriate orientation
5. Where TTB is extended behind guardrail, offset from the front face of guardrail to front face of TTB (min. 10 ft).

DM 23-07 Guardrail End Treatments

- Outside Shoulder (OS) Guardrail End Treatments
  - All MASH-compliant end treatments on the QPL are 31 in.
    - 27 ¾ in. and 31 in. should no longer be specified as supplemental description
  - Where a 27 ¾ in. system is needed, use standard GUARDRAIL END TREATMENT, TYPE OS pay item with supplemental description “SKT 350”
    - Terminating a curved w-beam terminal system or connector system
    - Insufficient room for MGS Height Transition
    - Terminating an NCHRP 350 guardrail or guardrail system
  - Coordinate with the INDOT Standards & Policy Division and document the decision as part of a Level Two design exception.

DM 23-07 Guardrail End Treatments

Median Shoulder (MS) Guardrail End Treatments

- Both products on the QPL are 31 in.
- Use of a 27 ¾” MS end treatment will be considered on a project-by-project basis.
- Coordinate with INDOT Standards & Policy Division, DesignManualInquiries@indot.in.gov

IHCP Supplement for MOT on High Volume Interstate Highways

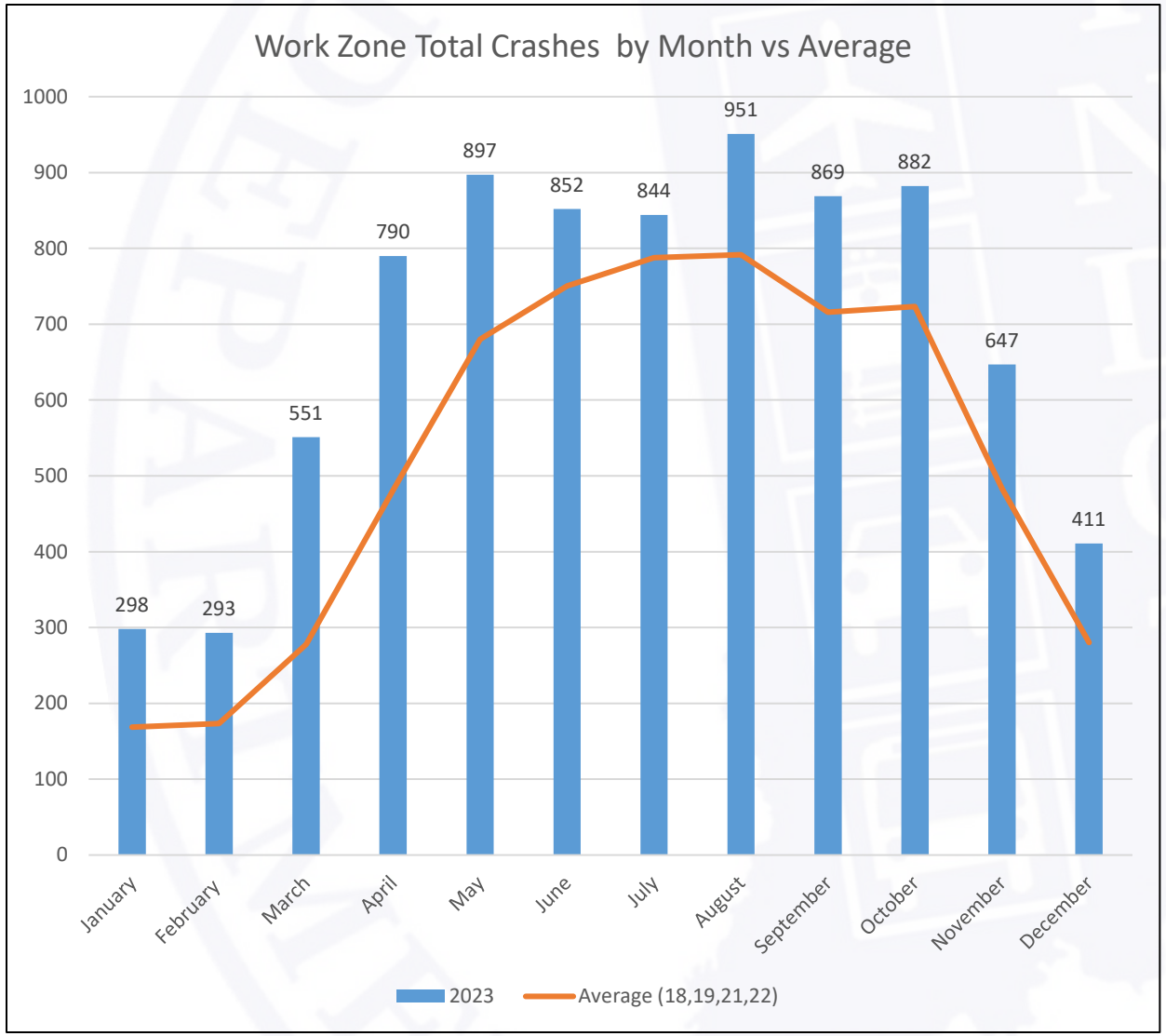
Traffic Engineering

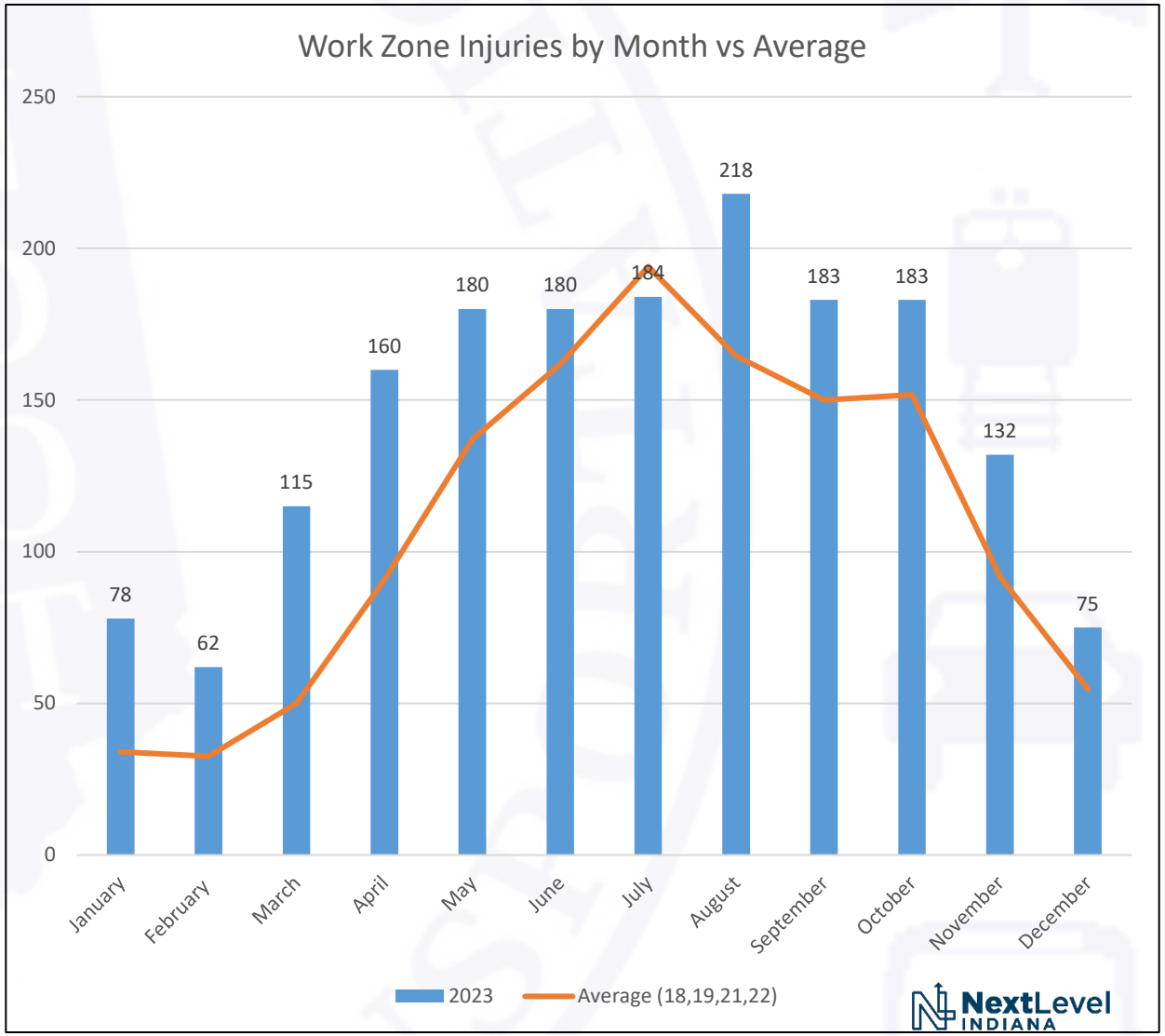
Policy Update

Dan McCoy, PE

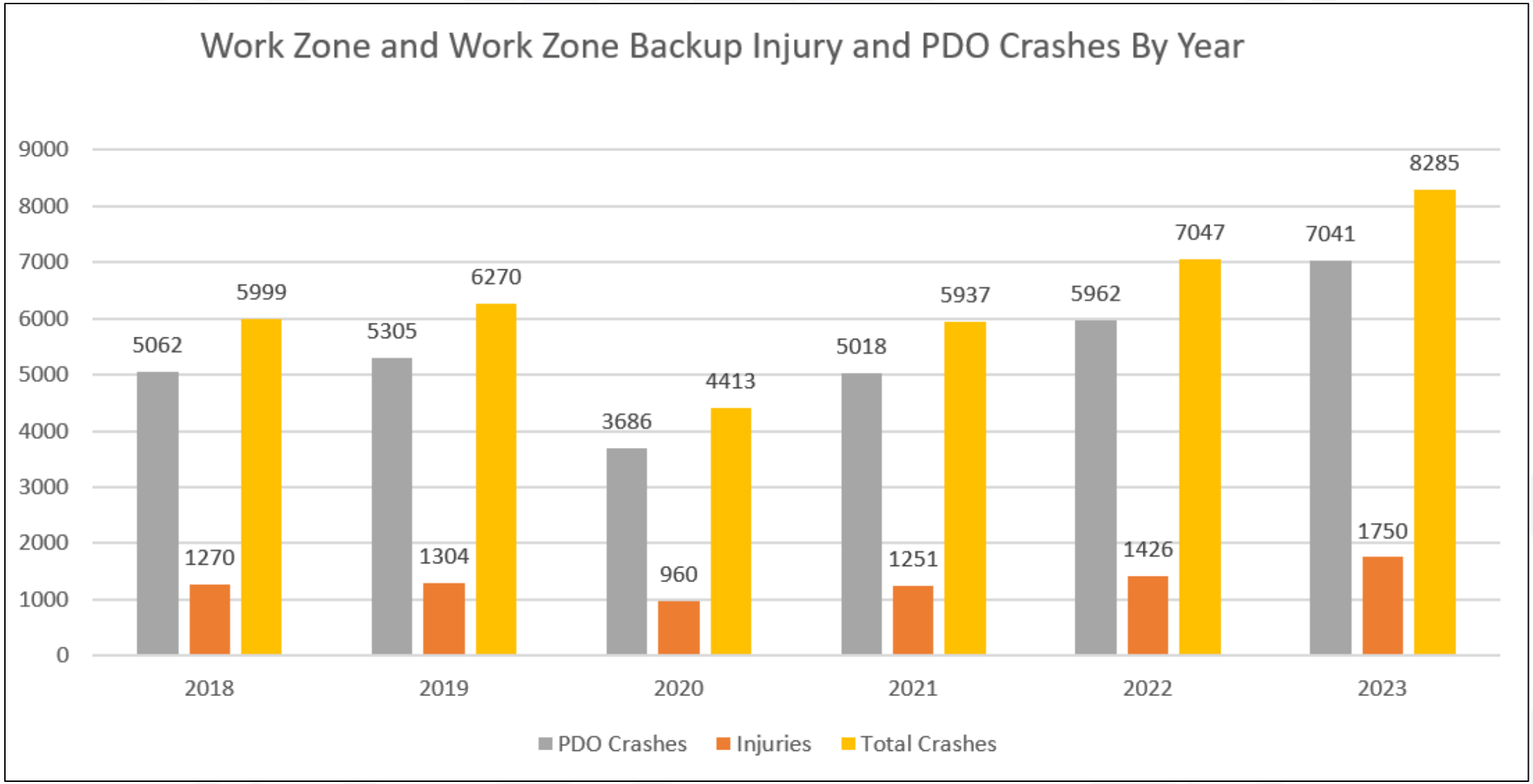
INDOT Traffic Engineering Director

How Did We Get Here?





How Did We Get Here?



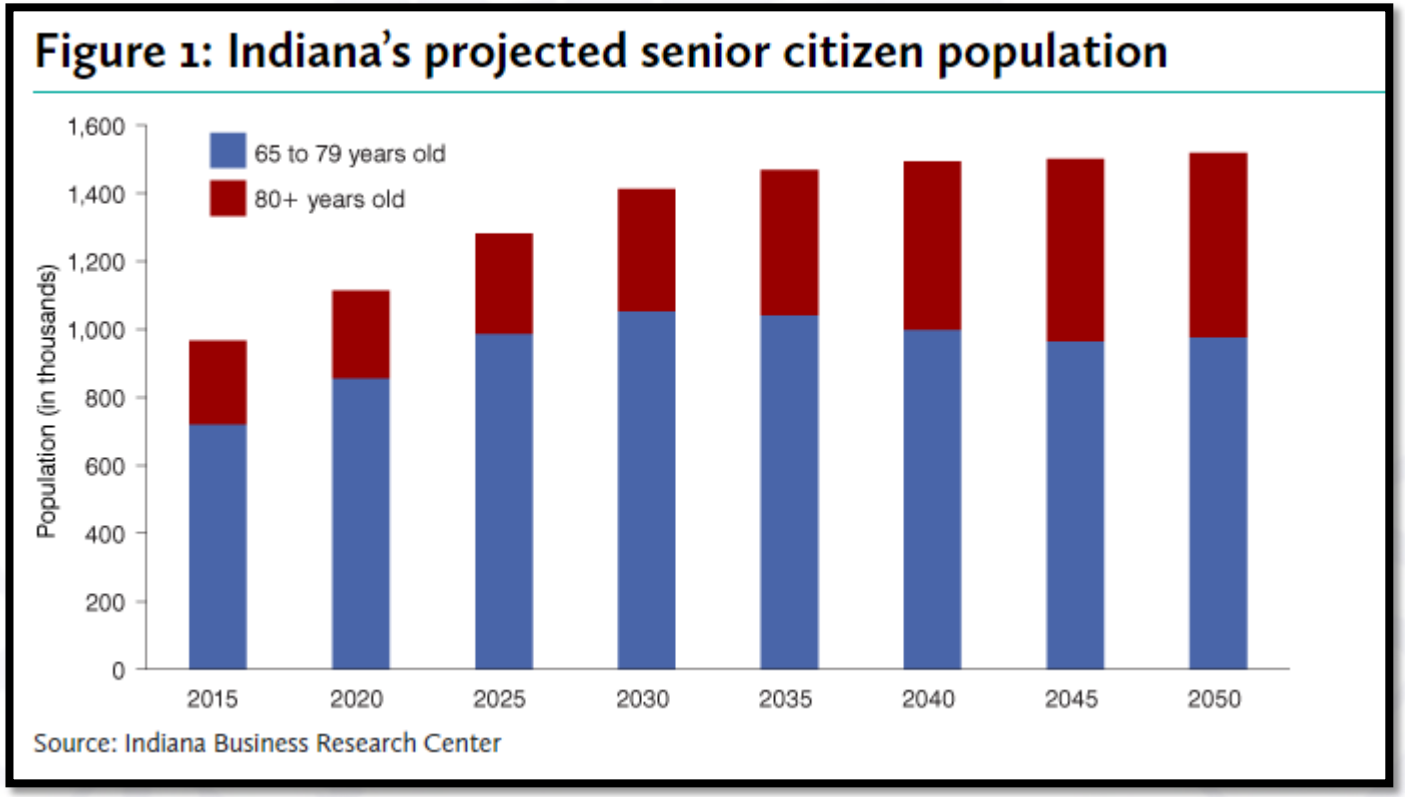
NextLevel INDIANA


Humans Make Mistakes
Humans are Vulnerable
Safety Needs to be Proactive

Behavioral Impact

What else is driving the increasing crash numbers?

- Driver Distraction is a bigger issue than the data implies
- Alcohol was a factor in 87 fatalities in 2023
- The number of older drivers on the road is growing



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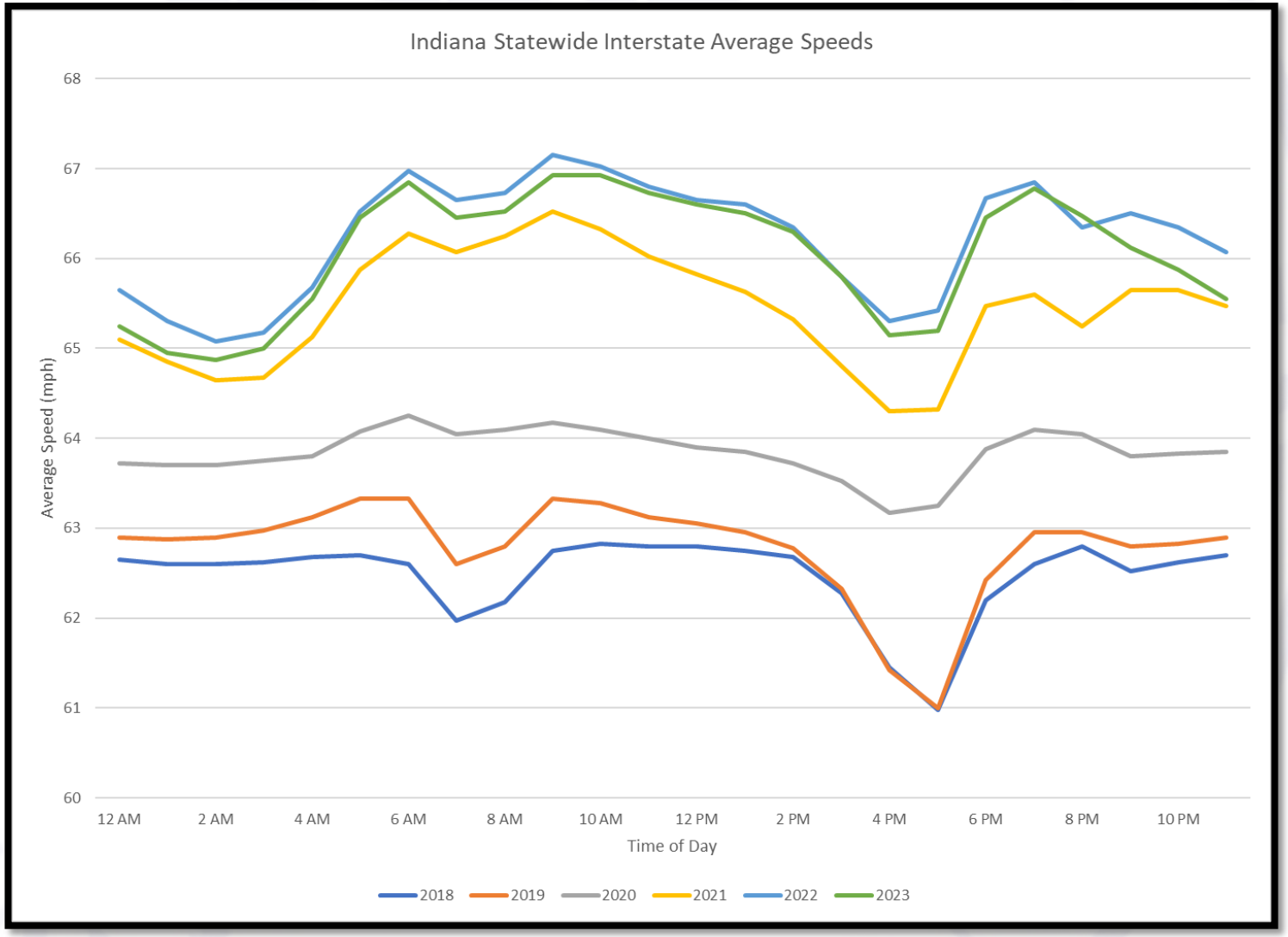
Speed Impact

Since the pandemic, Interstate speeds have increased significantly



5 mph Average Increase
On Interstates

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Minimal Shoulder – Single Lane & 2-Lane – Where is the Lane Line? – Edge of Pavement even Visible?

Unacceptable Driving Condition

No Room for Error

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Minimal Shoulder – Single Lane – Deteriorated Edge

Undesirable Driving Condition

Little Room for Error

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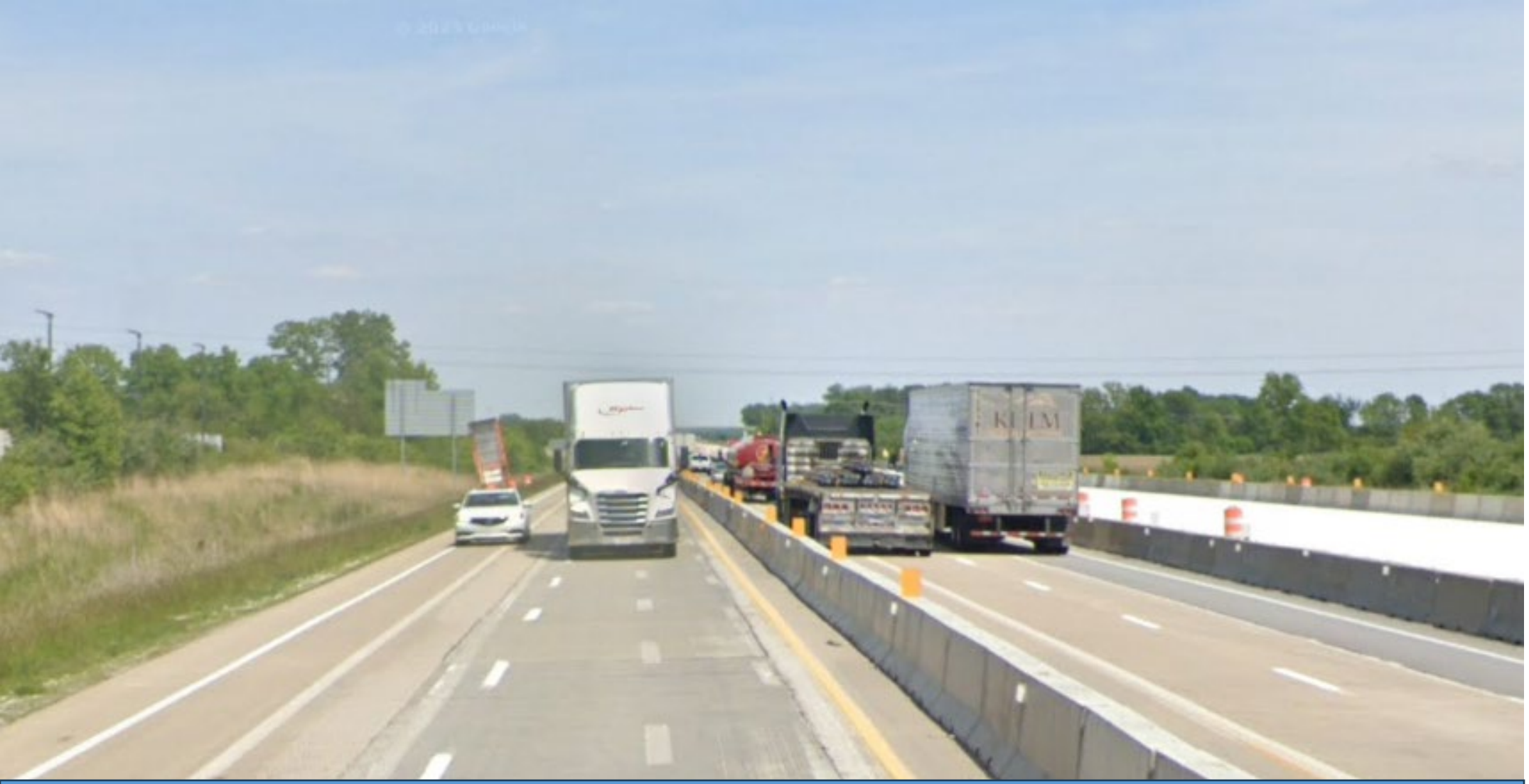

Visible Shoulder –2-Lanes Maintained – Where is the Lane Line?

Satisfactory Driving Condition

Some Room for Error

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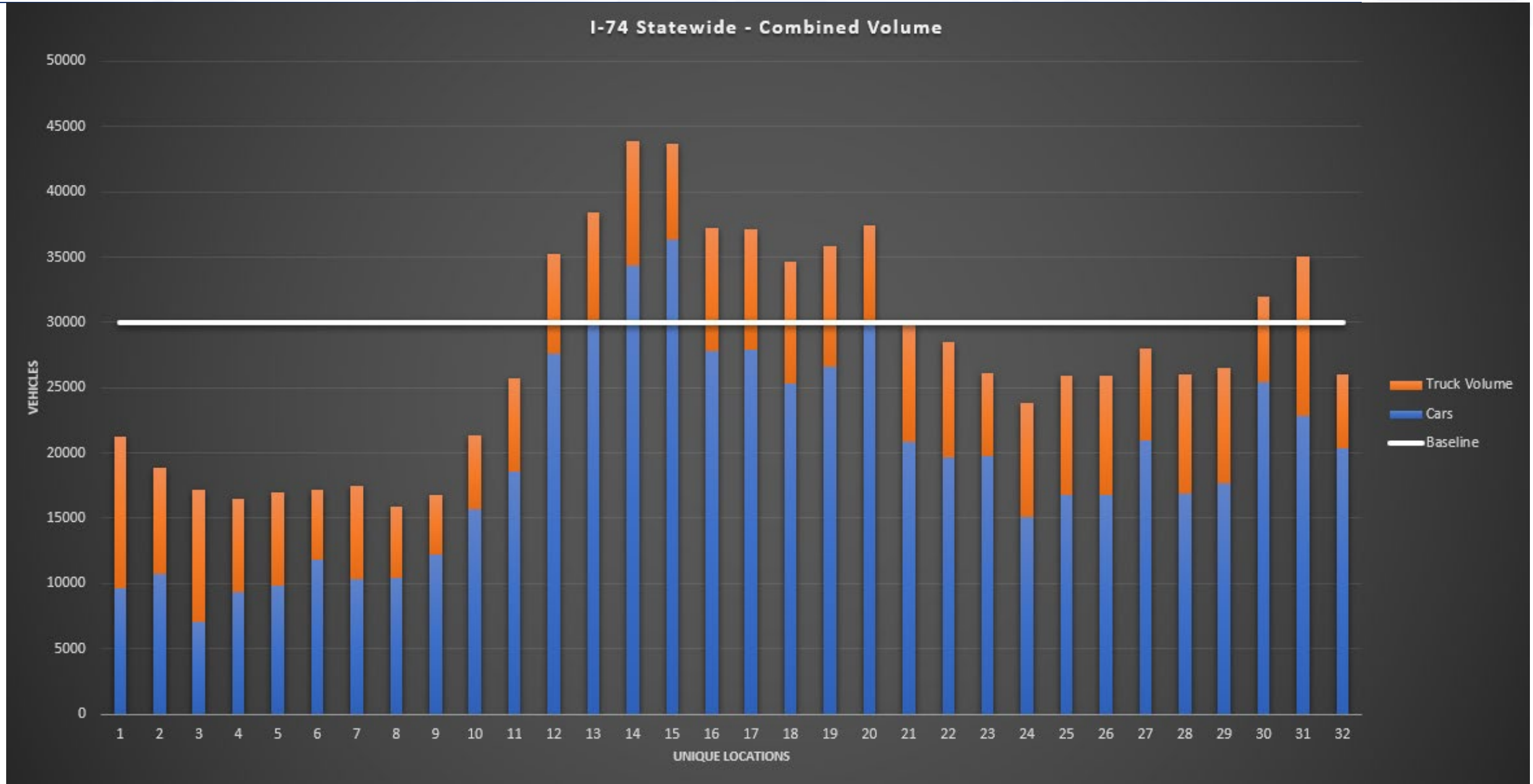
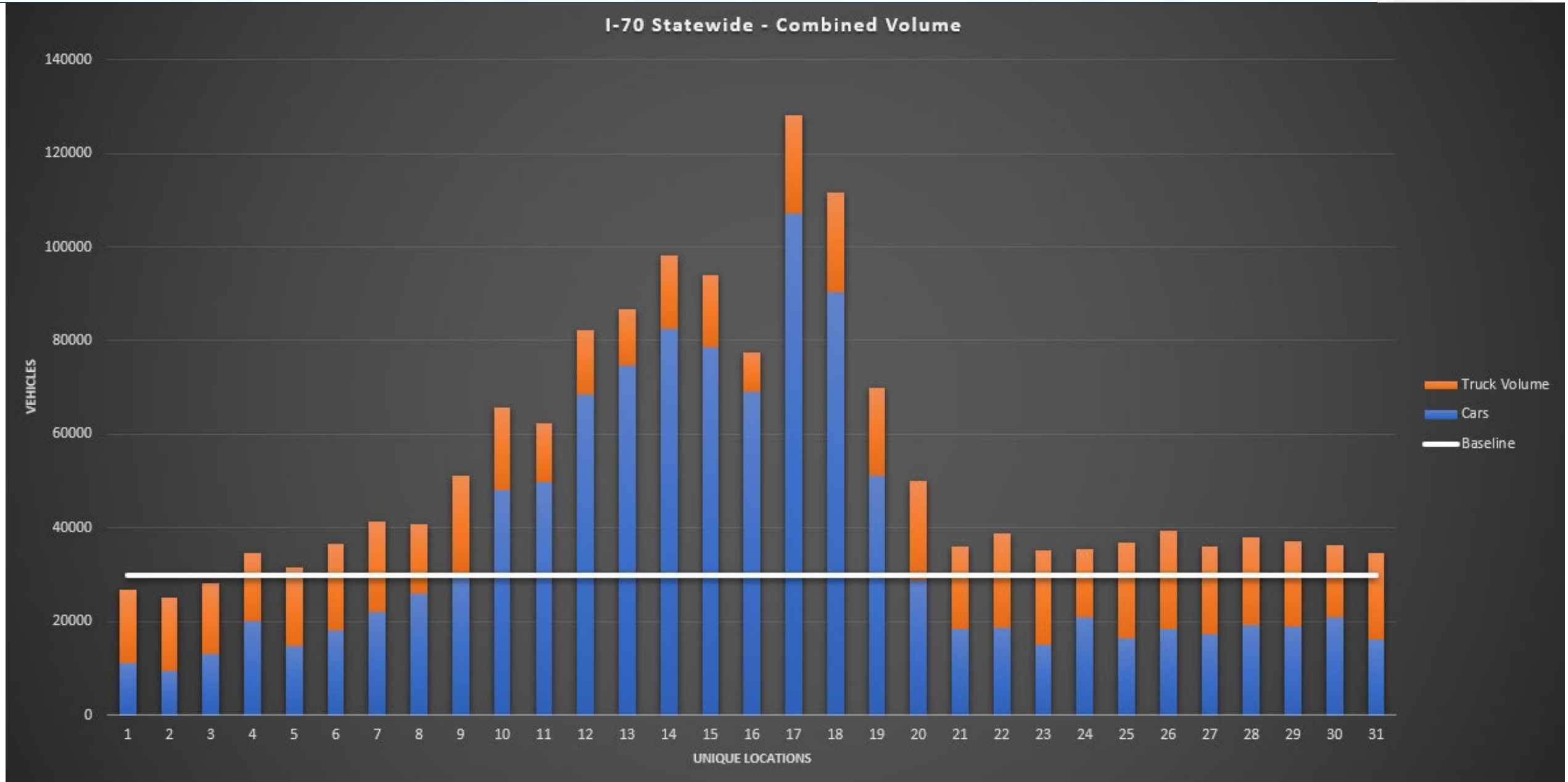
What Are We Doing?

- Expectation of Two Lanes Maintained
- 12 ft lanes and 2 ft shoulders
  - Preferred
- 12 ft lane / 11 ft lane and 2 ft shoulders
  - With Justification
  - Physical Constraints
- 11 ft lanes and 2 ft shoulders
  - With Justification
  - Additional Hardship

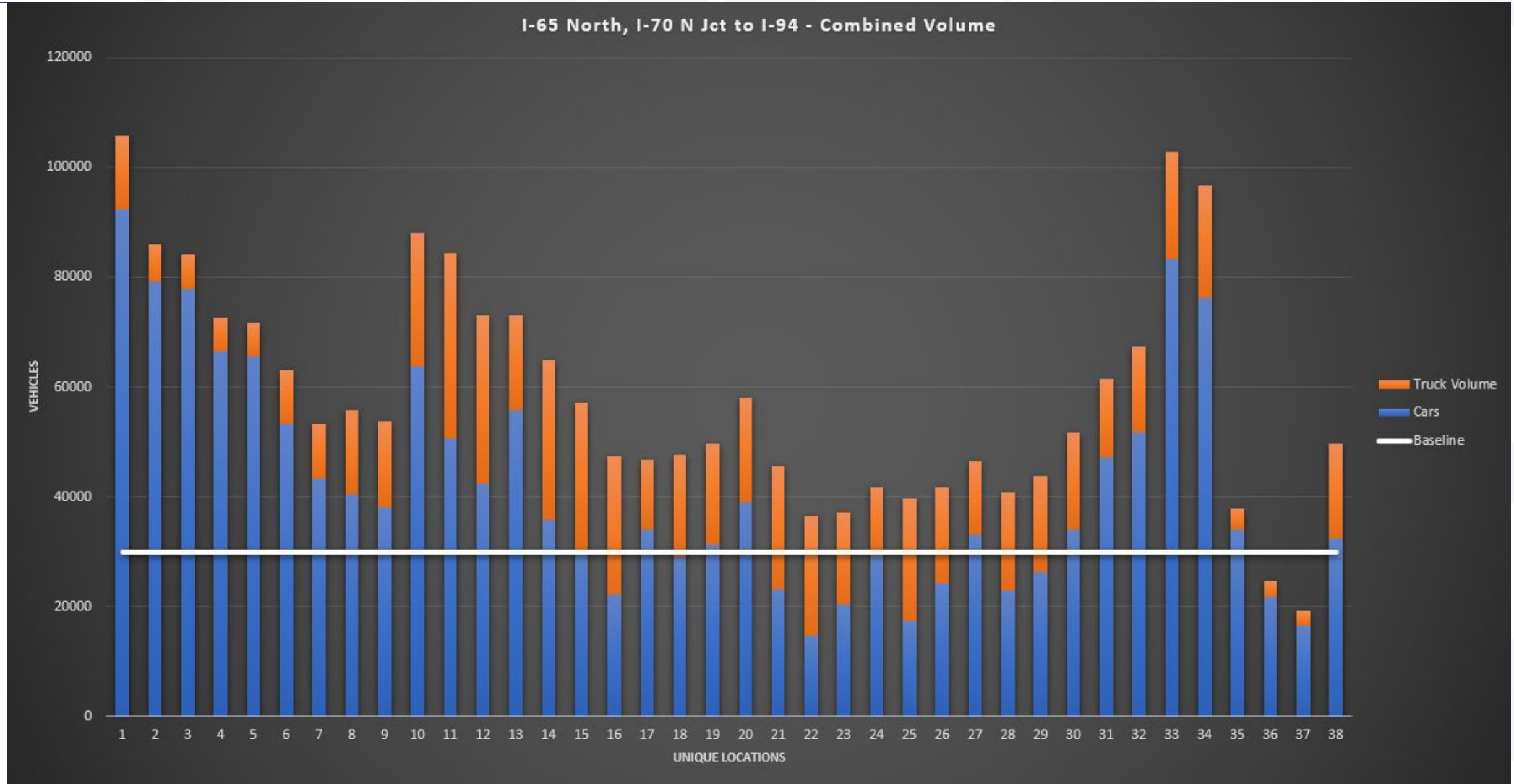
Why?


I-74 Statewide - Combined Volume
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
VEHICLES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
UNIQUE LOCATIONS
Truck Volume
Cars
Baseline

Why?


I-70 Statewide - Combined Volume
140000
120000
100000
80000
60000
40000
20000
0
VEHICLES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
UNIQUE LOCATIONS
Truck Volume
Cars
Baseline

Why?


I-65 North, I-70 N Jct to I-94 - Combined Volume
120000
100000
80000
60000
40000
20000
0
VEHICLES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
UNIQUE LOCATIONS
Truck Volume
Cars
Baseline

Update – Volume Thresholds

- It is about the Density
  - 30,000 Total Vehicles Per Day
  - 10,000 Total Trucks Per Day
- Considerations for High Peak Hour Volumes

Peak Hour Percentage	Daily Vehicular Volume	Daily Truck Volume
7%	26,000	8,000
8%	23,000	7,000
9%	20,500	6,500
≥10%	18,500	6,000

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Going Forward

The Goal:
Prioritize Traffic and Worker Safety

- Traffic Analysis – When Near 2-Lane Volume Baseline
  - Number of Hours Exceeding Thresholds
  - Expected Intensity of Queuing
  - History of Queuing
- Crash History
- MOT Alternatives Analysis
- Exceptions and Project Duration

Avoid Exceptions

Plan Ahead in Scoping Phase
Focus on Effective Solutions
Data Driven Decision Making

MOT Alternatives Analysis

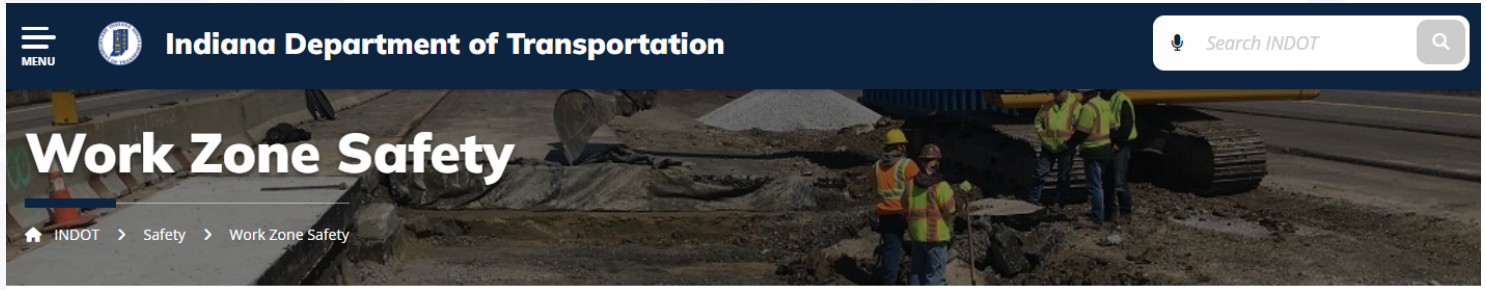
Benefits, Costs, Impacts
Consider Preferred First
Evaluate Constrained as Necessary

Short Term Lane Reductions

Will be Evaluated Based on IHCP
Justification Necessary
Longer Restrictions Strongly Discouraged

Coming Soon

- IHCP Supplement for MOT on High Volume Interstates
  - Operations Memo
  - Design Memo
  - To be Posted with Interstate Highway Congestion Policy



Work Zone Safety

Traveling through highway work zones can be frustrating. INDOT respects your time and understands that there is a real expense associated with road construction delays. INDOT works diligently to reduce the effect of construction activities, particularly on interstate highways, where statistics show there is greater risk of injury or death in a work zone crash.

To reduce the risk of work zone crashes for both workers and motorists, INDOT schedules and manages construction activity in accordance with the INDOT Interstate Highways Congestion Policy. INDOT employees and contractors often work nighttime and off-peak hours to ease congestion caused by construction and maintenance work.

INDOT also works hard to provide timely, accurate, and relevant work zone information to travelers using message boards, the INDOT TrafficWise website, the INDOT Real-Time Traffic Conditions website and social and traditional media. To reduce driver confusion, we focus on building and maintaining work zones where travel paths are clear and where driver expectations are known. Our goal is "No Surprises!" To protect our workers, we require high visibility safety apparel and protective equipment on all INDOT projects. We also work with law enforcement to provide extra police patrols in selected highway work zones to improve compliance with work zone regulations and improve worker and motorist safety.

We are dedicated to protecting all workers that build and maintain INDOT roadways. However, it's important to realize that 4 out of 5 people that die in highway work zones are either drivers or passengers. Accordingly, INDOT's Work Zone Safety group is also dedicated to protecting motorists who drive through our work zones.

NextLevel INDIANA

Bridge Design

Policy Updates

Pete White, PE

INDOT Bridge Design Manager

Bridge Specific Design Memos

Memo Number	Memo Date	Subject
24-02	1/9/2024	Lightweight Concrete, Threaded Tie Bar Assemblies, and Concrete Cover
24-01	1/9/2024	Subgrade Treatment

Memo Number	Memo Date	Subject
23-21	12/8/2023	HMA Pavement PG Binder
23-20	11/15/2023	Extended Pile Bents and Wall Pier on Single Row of Piles
23-19	11/15/2023	Joint Probability Analysis
23-18	11/15/2023	Survey Transmittal Updates
23-17	10/16/2023	Placing and Terminating Temporary Traffic Barrier
23-16	10/16/2023	Public Rights-of-Way Accessibility Guidelines (PROWAG)
23-15	10/16/2023	Build America, Buy America
23-14	10/16/2023	Foundation Review Procedure

Memo Number	Memo Date	Subject
23-13	9/14/2023	Hydraulic Reviews and Replacement-In-Kind
23-12	9/14/2023	Design Exceptions
23-11	9/14/2023	Payment for Elastomeric Bearing Assemblies
23-10	8/14/2023	Bridge Painting
23-09	7/19/2023	2023 INDOT *Standard Drawings*
23-08	7/11/2023	Railroad Flagging
23-07	7/11/2023	Guardrail End Treatments
23-06	6/19/2023	Cross Slope Correction
23-05	6/14/2023	Standardized Elastomeric Bearing Revisions
23-04 Rev.	05/12/23 rev. 05/30/23	Chapter 503 Revisions
23-03	5/12/2023	Stormwater Management
23-02	5/12/2023	Void Reducing Asphalt Membrane for Asphalt Paving
23-01	1/5/2023	Outlet Protection

DM 23-05 Standardized Elastomeric Bearing Revisions

- **Elastomeric bearings should be design using LRFD Method A**

Method A

- Simplified design process
- Geometric ($S_i^2/n < 22$) and performance constraints (0.2 rad rotation)
- AASHTO M 251 testing requirements easier and less time consuming

Method B

- Detailed design procedures
- Potential for higher capacities and movements
- AASHTO M 251 testing requirements much more rigorous and not typically performed by INDOT Materials and Tests ($$$)

- **Typically, no savings using Method B due to increased testing**

DM 23-05 Standardized Elastomeric Bearing Revisions

- **409-7.03 & 409-7.04 updated to highlight LRFD requirements**

of the *AASHTO LRFD Bridge Construction Specifications* and AASHTO M 251. If the material is specified by its hardness, the shear modulus for design purposes shall be taken as the least favorable value from the range for that hardness given in Table 14.7.6.2-1. Intermediate values may be obtained by interpolation. If the material is specified by shear modulus, it shall be taken for design purposes as the least favorable from the value specified

LRFD requires least favorable shear modulus for design

Standard Specs allow 50 to 60

TABLE A

PRENE, OR NATURAL RUBBER, QUALITY CONTROL TESTS

	PHYSICAL PROPERTIES	
0	Hardness (Durometer Type A)	55 ±5
ASTM D412	Tensile Strength, min., ksi	2.25
	Ultimate Elongation, min., %	425
	STANCE	

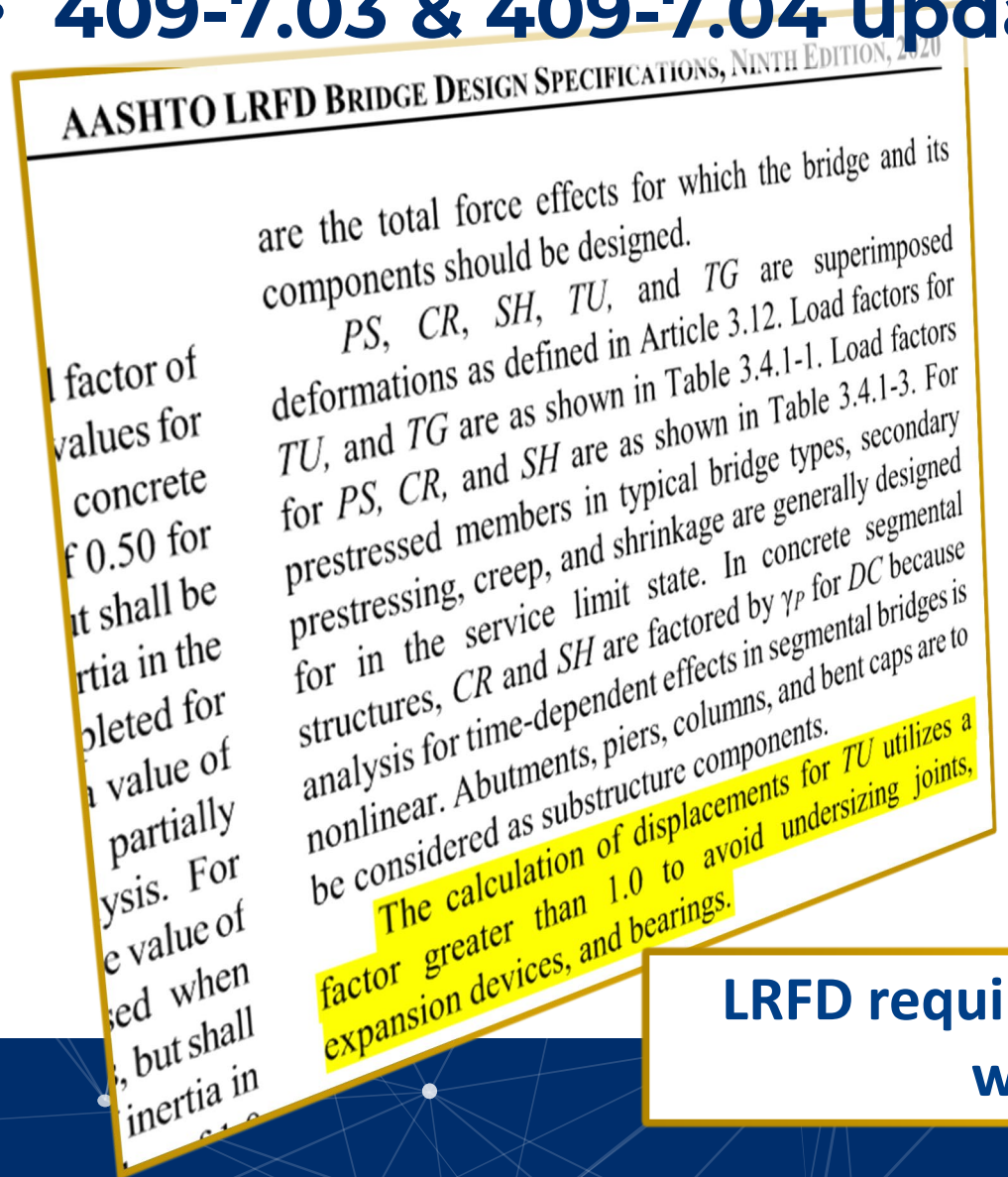
Table 14.7.6.2-1—Correlated Material Properties

	Hardness (Shore A)	
	50	60
Shear Modulus @ 73°F (ksi)	0.095–0.130	0.130–0.200
Creep deflection @ 25 yr divided by initial deflection	0.25	0.35

Shear modulus should be least favorable of 0.095 to 0.200 ksi

DM 23-05 Standardized Elastomeric Bearing Revisions

- **409-7.03 & 409-7.04 updated to highlight LRFD requirements**



AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, NINTH EDITION, 2020

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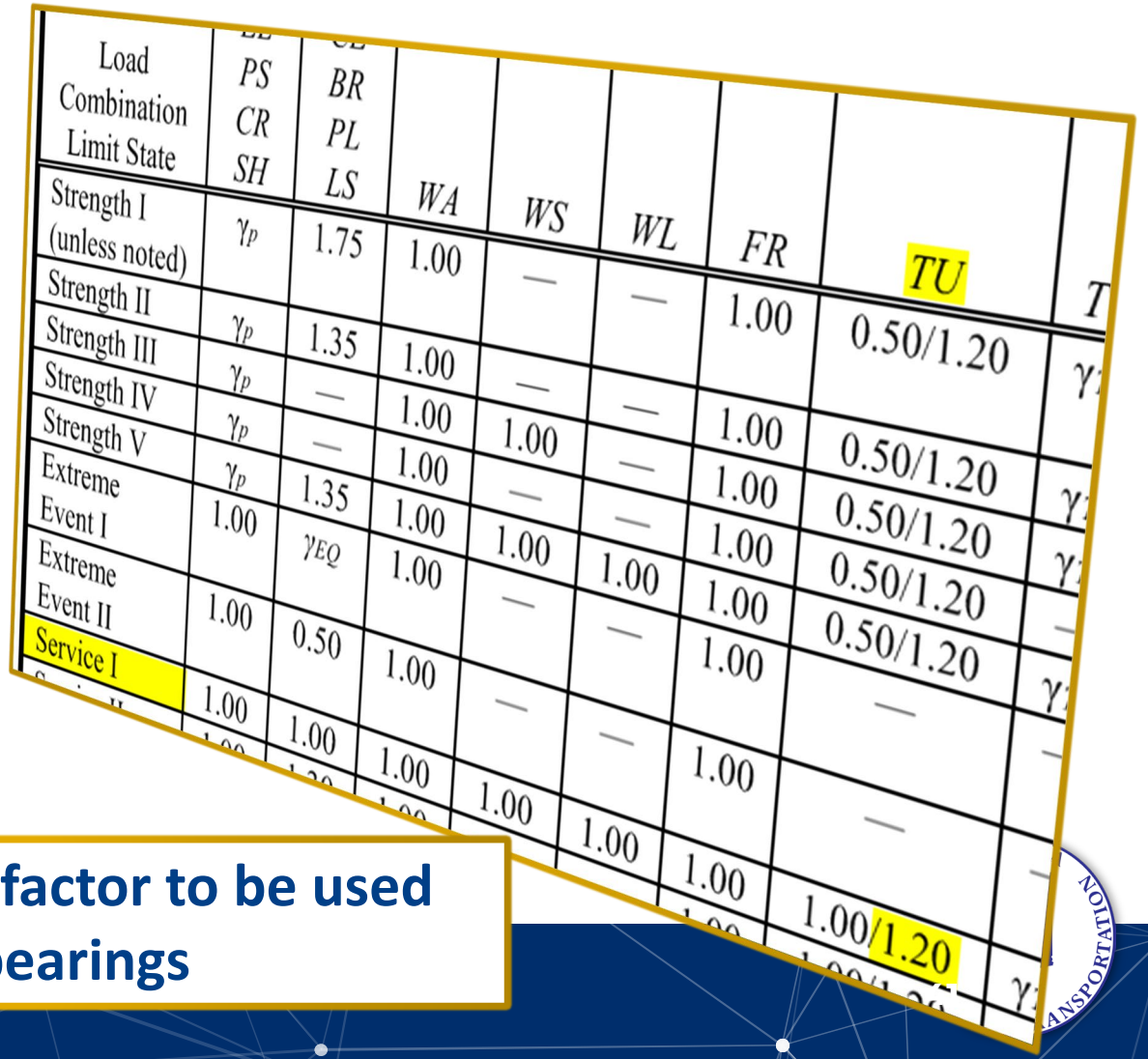
are the total force effects for which the bridge and its components should be designed.

PS, *CR*, *SH*, *TU*, and *TG* are superimposed deformations as defined in Article 3.12. Load factors for *TU*, and *TG* are as shown in Table 3.4.1-1. Load factors for *PS*, *CR*, and *SH* are as shown in Table 3.4.1-3. For prestressed members in typical bridge types, secondary prestressing, creep, and shrinkage are generally designed for in the service limit state. In concrete segmental structures, *CR* and *SH* are factored by γ_P for *DC* because analysis for time-dependent effects in segmental bridges is nonlinear. Abutments, piers, columns, and bent caps are to be considered as substructure components.

The calculation of displacements for *TU* utilizes a factor greater than 1.0 to avoid undersizing joints, expansion devices, and bearings.



Load Combination Limit State	PS CR SH	BR PL LS	WA	WS	WL	FR	TU	T
Strength I (unless noted)	γ_p	1.75	1.00	—	—	1.00	0.50/1.20	γ_1
Strength II	γ_p	1.35	1.00	—	—	1.00	0.50/1.20	γ_1
Strength III	γ_p	—	1.00	1.00	—	1.00	0.50/1.20	γ_1
Strength IV	γ_p	—	1.00	—	—	1.00	0.50/1.20	γ_1
Strength V	γ_p	1.35	1.00	1.00	—	1.00	0.50/1.20	γ_1
Extreme Event I	1.00	γ_{EQ}	1.00	—	—	1.00	0.50/1.20	—
Extreme Event II	1.00	0.50	1.00	—	—	1.00	—	γ_1
Service I	1.00	1.00	1.00	—	—	1.00	—	—
	1.00	1.00	1.00	1.00	1.00	1.00	—	—
						1.00	1.00/1.20	γ_1

LRFD requires 1.2 load factor to be used when sizing bearings

DM 23-05 Standardized Elastomeric Bearing Revisions

- **Figs. 409-7A thru 7E updated to provide max. reactions & max. expansion lengths for Std. Drwg. series E 726-BEBP bearings**

Maximum *DL + LL* Reaction, (kip)	Maximum Expansion Length, (ft)	Bearing-Pad Type
306	341	**T1**
394	396	**T2**
452	532	**T3**
570	598	**T4**
547	341	**TH1**
714	396	**TH2**
837	532	**TH3**
1007	598	**TH4**

Previous Table

Maximum *DL + LL* Reaction, (kip)	Maximum Expansion Length, (ft)	Bearing-Pad Type
255	295	**T1**
330	340	**T2**
380	460	**T3**
480	515	**T4**
460	295	**TH1**
600	340	**TH2**
705	460	**TH3**
850	515	**TH4**

Current Table

TABLE OF DIMENSIONS

Bearing Designation	Bearing Width W	Bearing Length L	Internal Elastomer Thickness h_{ri}	Number of Internal Elastomer Layers n	External Elastomer Thickness t_e	h_{rt}	Number of Steel Shims n_s	Bearing Total Thickness H
T1	23"	12"	1/2"	5	9/32"	3 1/16"	6	3 11/16"
T2	23"	14"	1/2"	6	9/32"	3 9/16"	7	4 5/16"
T3	23"	17"	19/32"	7	5/16"	4 25/32"	8	5 5/8"
T4	24"	19"	19/32"	8	5/16"	5 3/8"	9	6 5/16"

INDIANA DEPARTMENT OF TRANSPORTATION

BRIDGE ELASTOMERIC BEARING PADS
TYPE T-1 to T-4
FOR PRESTRESSED BULB-TEE BEAMS

SEPTEMBER 2009

STANDARD DRAWING NO. E 726-BEBP-02

DM 23-11 Payment for Elastomeric Bearing Assemblies

- RSP 726-B-323 effective for lettings on or after June 1, 2024 will include a pay item for elastomeric bearing assemblies
- Previous payment for elastomeric bearing assemblies:
  - Incidental to superstructure
    - If supporting new structural members
  - Direct payment
    - If not supporting new structural members (semi-integral, by USP)
    - If a sliding surface is specified (PTFE)

- Direct payment for elastomeric bearing assemblies will provide greater consistency and price tracking

DM 23-20 Extended Pile Bents & Wall Piers on Single Row of Piling

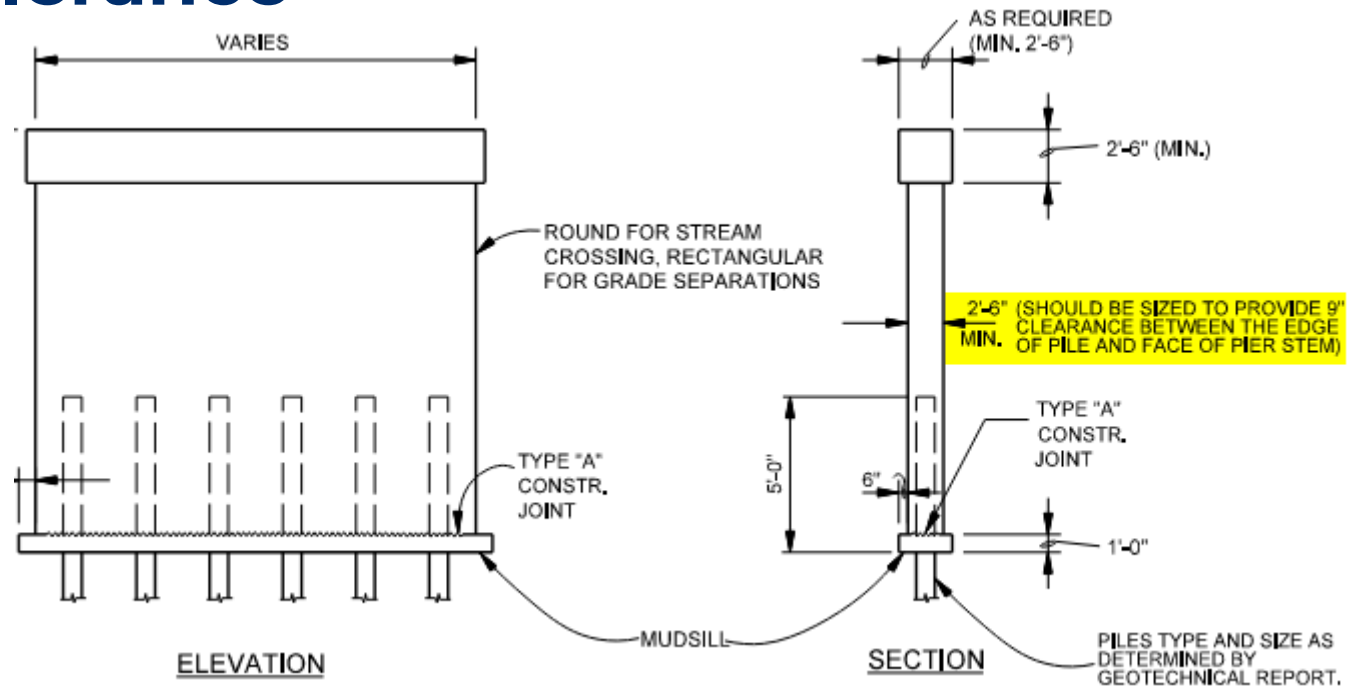
- **Life cycle cost considerations for extended pile bents often offsets initial cost savings**
  - **Piles need to be repainted periodically**
  - **Reduces likelihood of superstructure replacement**

DM 23-20 Extended Pile Bents & Wall Piers on Single Row of Piling

- **Suggested wall height increased from 20 ft to 25 ft when wall pier may be more economical than hammerhead per**
- **Min. wall pier width for single row of piles increased to 2’-6” to provide pile driving tolerance**

2. Stem-Type Pier. The types of stem piers are as follows.

a. Wall Pier. This is a relatively thin wall, set on a single row of piles, a spread footing, or a pile cap with multiple rows of piles. A wall pier is typically most cost effective if its structural height is less than 25 ft. See Figure 409-6B for a wall pier on a single row of piles.



DM 23-20 Extended Pile Bents & Wall Piers on Single Row of Piling

- **Limitations on use of single row piling foundations**
  - **Piers have tilted during initial construction and superstructure replacements**
  - **Purdue research suggests min. SPT blow count of 7 within 5d depth below bottom of pier**

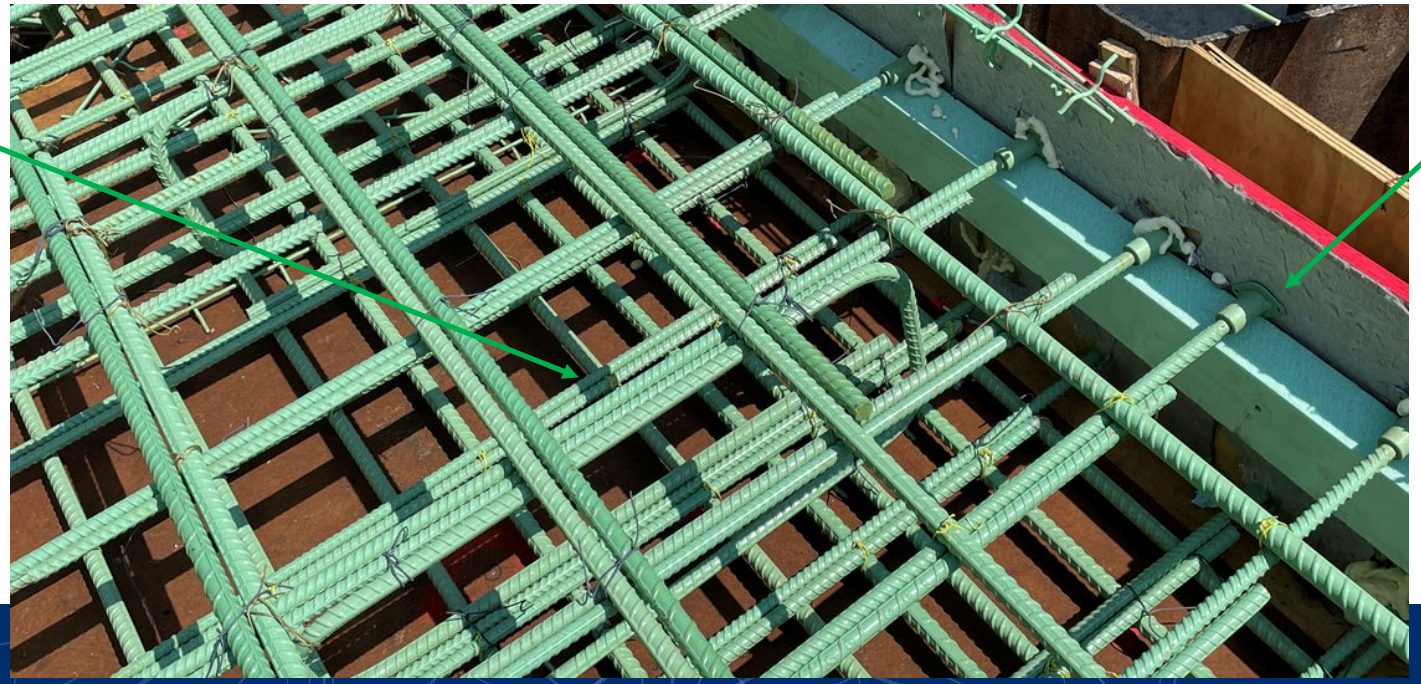
times the pile diameter below the bottom of pier. For additional information, please see the following research:

Wang, Y., Lim, J., Salgado, R., Prezzi, M., & Hunter, J. (2022). *Pile Stability Analysis in Soft or Loose Soils: Guidance on Foundation Design Assumptions with Respect to Loose or Soft Soil Effects on Pile Lateral Capacity and Stability* (Joint Transportation Research Program Publication No. FHWA/IN/JTRP-2022/24). West Lafayette, IN: Purdue University.

DM 24-02 Lightweight Concrete, TTBA's, and Concrete Cover

- **Threaded Tie Bar Assemblies (TTBA)**
  - **Utilize mechanical splice connections across construction joints**
  - **Usually lap spliced with typical bar to provide continuity**
  - **Lengths on each side of joint should be shown on plans**

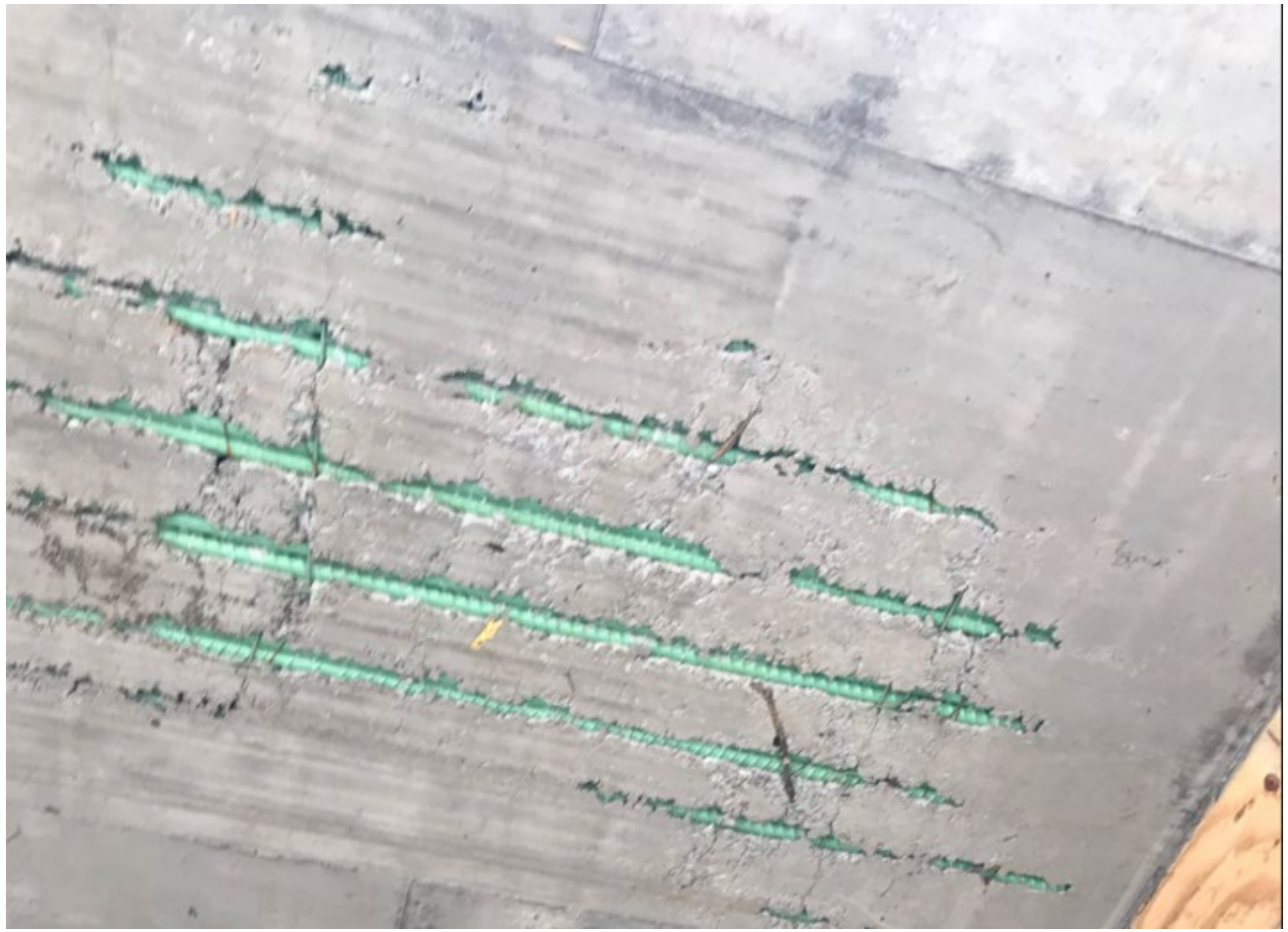
Lap splice to typical reinforcement



Mechanical "form saver" splice

DM 24-02 Lightweight Concrete, TTBA's, and Concrete Cover

- **Concrete Cover**
  - **Previous practice of 1" cover to bott. bars in slab superstructure resulted in instances of poor consolidation or insufficient cover**
  - **Depth of slab superstructure provides room for additional cover without significant loss in efficiency**



DM 24-02 Lightweight Concrete, TTBA's, and Concrete Cover

- **Lightweight Concrete for Floor Slabs (RSP 704-B-325)**
  - **Typical concrete weight is reduced to 120 pcf, 125 pcf design (includes rebar), by using less dense coarse aggregates**

PROS

- Ability to replace existing deck without reducing live load capacity
- Porous aggregates may promote internal curing

CONS

- Expensive (est. $400/CYS premium)
- Trial batch requires over 90 days for testing
- Lower compressive strength due to softer aggregate
- Porous aggregates may increase risk of shrinkage cracking

  - **Only recommended in restrictive situations, such as historic bridges (approval by Director of Bridge Engineering)**

DM 23-10 Bridge Painting (Coating)

- **Painting beam ends prior to concrete encasement (semi-integral)**
  - **Painting prior to encasement (beam ends only), and after other significant work (deck replacement) requires multiple mobilizations of painting**
  - **IDM 17-5.11 & Fig. 17-5L updated to clarify required pay items**

If project contains …	And…	Use the following pay items:	Notes
Semi-integral end bent conversion (encasing existing steel beam in concrete)	Beams are being fully painted	Clean Steel Bridge, Partial, QP-[1 or 2], Br. No. (LS) Paint Steel Bridge, Partial, Br. No. (LS) -and- Clean Steel Bridge, QP-[1 or 2], Br. No. (LS) Paint Steel Bridge, Br. No. (LS) -and- Disposal of Cleaning Waste, [waste type], Br. No. (LS)	See Notes on Page 1.
Semi-integral end bent conversion (encasing existing steel beam in concrete)	Beams are not being fully painted	Clean Steel Bridge, Partial, QP-[1 or 2], Br. No. (LS) Paint Steel Bridge, Partial, Br. No. (LS) -and- Disposal of Cleaning Waste, [waste type], Br. No. (LS)	

Fig. 17-5L (Page 2 of 2)

DM 23-14 Foundation Review Procedure

- **IDM 408-1.06(02) revised**
  - **Nomenclature more consistent with LRFD**
  - **Review now performed by INDOT Geotech rather than Bridge Design**

> 6. The project reviewer submits the form to INDOT Geotechnical Engineering Division at Geotech@indot.IN.gov. If the Division representative concurs with the recommendations, he or she signs and dates the form.
>
> 7. The INDOT Geotechnical Engineering representative transmits the completed Foundation Review form to the project manager, who will send the completed form to the designer for inclusion in the Final Tracings submission.

- **Previous LRFD Foundation Review Form split into two forms**

408-1B-LRFD	Foundation Review (LRFD) - PILES (Rev. Oct. 2023)
408-1C-LRFD	Foundation Review (LRFD) - SPREAD FOOTING (New. Oct. 2023)

QUESTIONS?

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Thank you for keeping up with changes to Standards and Policy

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DesignManualInquiries@indot.IN.gov