PBPD AT ODOT









OHIO DEPARTMENT OF TRANSPORTATION

LOUISIANA TRANSPORTATION CONFERENCE

TOPICS

- What is PBPD at ODOT
- Traditional versus our PBPD
- What PBPD is NOT
- ODOT PBPD Implementation
- Examples of PBPD

PBPD AT ODOT

PBPD – WHAT IS IT

- Performance Based Project Development (PBPD)
  - Not Practical Design
    - Practical design is design centric
    - We have done Practical Design for many years – it's called Design Exceptions

PBPD – WHAT IS IT

- Performance Based Project Development

  - Project Development is more encompassing and applies "practical" principals to other parts of project development – most notably:
    - P&N; and
    - Project Scope; and
    - Alternatives Study.

PBPD – WHAT IS IT

- Goal of our PBPD is to right size project to fix what is broken – not try to make the "perfect" project where "perfect = meeting all standards"

"Perfect is the enemy of good" – *Voltaire*

PBPD – WHAT IS IT

o Fixing What is Broken

From DRAFT 2018 Green Book

It is important to understand that noncompliance with **geometric design criteria is not, by itself, a performance issue** for a project on an existing road. Noncompliance with geometric design criteria is not sufficient to be identified as an issue in a project purpose and need statement; such noncompliance with geometric design criteria only becomes an issue to be addressed in the project purpose and need if that noncompliance has resulted in (or is forecast to result in) poor performance that is correctable by a geometric design improvement and that the agency chooses to address.

PBPD – WHAT IS IT

- Right size project at the start via P&N and Scope rather than just cut at the end via Design Exceptions.

(or don't build at all because too expensive)

PBPD – WHAT IS IT

- Bottom Line…. It is better to build many "good" projects rather than just a couple of "perfect" projects.

- More projects = more improvements to more parts of the system. It's not about skimping on one project – it's about improving MORE of the system.

PBPD – WHAT IS IT

- PBPD is officially recognized in Ohio

NEW L&D Volume 1 – Section 1000

1000 Performance Based Project Development (PBPD)

Table of Contents

TRADITIONAL VS. PBPD

TRADITIONAL VS. PBPD

Traditional	PBPD
Project Scope – Fix everything to standard	Fix what is broken
Measure of Success – as few design exceptions as possible	Design Exceptions are NOT inherently bad. They just document a thoughtful decision.
Measure of Success – meet all of the standards (LOS, Cross Section, etc.)	Compare improvements to the existing – not just "the standard". **Design Up**
Context = Defined by the functional class. Type, size, footprint of road defined by standards.	Can consider the surroundings (the actual "context")
Safety = Defined by meeting Standard	Use HSM to measure/predict safety performance of decisions
Funding – Design it to Standard and wait for god knows how long to build it when the money is available	It's better to make an affordable & substantive improvement **NOW**

TRADITIONAL VS. PBPD

The DRAFT AASHTO Green Book is Embracing Practical Principals

- "The policy also encourages flexible design, which emphasizes the role of the planner and designer in determining appropriate design dimensions based on project-specific conditions and existing and future roadway performance more than on meeting specific nominal design criteria."

- "Traditional applications of this policy took the approach that, if the geometric design of a project met or exceeded specific dimensional design criteria, it would be likely to perform well. In some cases, this may have led to overdesign, constructing projects that were more costly than they needed to be or were inappropriate for the roadway context."

WHAT PBPD IS NOT

WHAT PBPD IS NOT

WHAT PBPD IS NOT

- From the video:
  - *It meets standards - therefore it is safe*;
    - HSM may be able quantify
  - No consideration of context (livable communities);
  - Are the “standards” creating reasonable (i.e. practical) impacts?

WHAT PBPD IS NOT

- PBPD is NOT:
  - Total disregard of the Standards. (MISCONCEPTION is possible)
  - Always violating standards because its cheaper:
    - What are the safety ramifications (existing crashes and predicted future)?
    - What impacts do we avoid (B/C)?
    - Are we still meeting the P&N?
    - Do the standards fit the context?

ODOT PBPD IMPLEMENTATION

PBPD – WHAT IS IT

- Right Size Project – P&N, Scope, Alternative Study

- Right Size Impacts – Design Exceptions

PBPD IMPLEMENTATION - PLANNING

Purpose & Need

- Primary or Secondary Need *(We made this up)*

- Scope

PBPD IMPLEMENTATION - PLANNING

Purpose & Need
- Primary or Secondary Need
- Scope

- P&N: Focus on Fixing What is Broken*
  - **Primary Need** – Must address
  - **Secondary Need** – Fix based on impacts and costs (Decision made during Feasibility – not now)

* **Broken** = Safety, Operational or System Condition Problems. ***It isn't necessarily broken if doesn't meet "standard"***

PBPD IMPLEMENTATION - PLANNING

- From the DRAFT AASHTO Green Book:
  - The performance-based approach to establishing the purpose and need for and the objectives of the project enables the designer to focus on addressing the needs of a project without needlessly exceeding them. By limiting a project's scope to focus only on documented performance improvement needs, more resources are available to be spent on other needs throughout the road and street system.

- From the DRAFT AASHTO Green Book:

10. GRADE SEPARATIONS AND INTERCHANGES

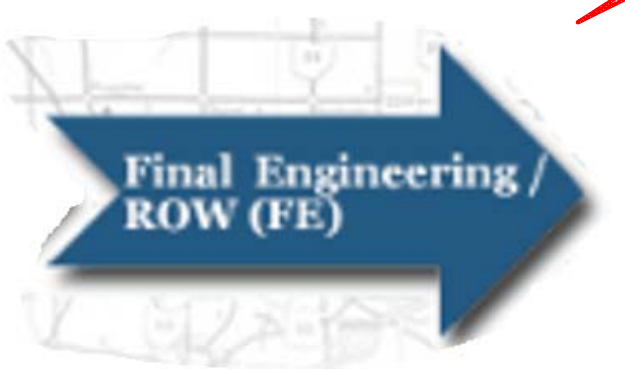
The specific dimensional design criteria presented in this chapter are appropriate as a guide for new construction of grade separations and interchanges. Projects to improve existing grade separations and interchanges differ from new construction in that the performance of the existing facility is known and can guide the design process. Features of the existing design that are performing well may remain unchanged, while features that are performing poorly should be improved, where practical. Chapter 1 presents a flexible, performance-based design process that can be applied in developing projects for grade separations and interchanges.

PBPD IMPLEMENTATION – PRELIMINARY ENGINEERING

<u>Feasibility (Alternative) Study</u>

- Deciding What is Practical
- What 2ndary Needs to Address

PBPD IMPLEMENTATION - DESIGN



<u>Design</u>

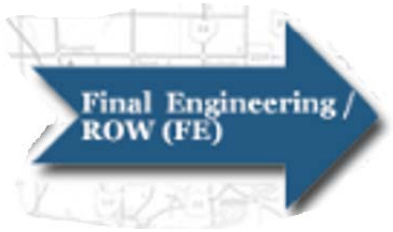
- Design Exceptions

PBPD IMPLEMENTATION - DESIGN

Design Exceptions

- Historically, D.E.'s were text based and quite lengthy
- Viewed as burdensome and time consuming
- In PBPD – we didn't want the D.E. process to be a disincentive for valid requests

PBPD IMPLEMENTATION - DESIGN



Design Exceptions

- New Electronic Format
- HSM used (depending on situation) to quantify safety ramifications of D.E. i.e. Future safety performance
- GCAT used to examine Historical safety performance

Section Description

General Description

Minor widening and re-striping of I-71 NB and SB to provide 4 through lanes in each direction between Main Street and Broad Street. The inside and outside shoulder of I-71 SB will need to transition down to 4 feet in order for the four (4) 12 foot lanes to pass between the
Town Street Bridge abutment and pier. The inside shoulder reduction will occur over a 1,250 feet length. The outside shoulder width will occur for
500 feet before tying back into the existing ramp shoulders.

Detailed Section information (Optional):

Route ID: IR 71 NLFID: SFRAIR00071**C	Section Begin - Section End - Use TIMS to find project information
Begin Section: Latitude , Longitude 39.957698 , -82.983154 Convert Logpoints to Coordinates here	End Section: Latitude , Longitude 39.964266 , -82.983094 Convert Logpoints to Coordinates here

Google Map | Bing Map | Pathweb Link (State System Only)

Design Designation

ADT Current Year:	2015	Trucks 24 hr BC:	10
ADT Current Value:	72,300	Td:	6
ADT Design Year:	2035	Speed Design:	60
ADT Design Value:	87,960	Speed Legal:	55
DHV Year:	2035	FC Design:	1 - Interstates
DHV Value:	8,800	FC Area Type:	Urban
Directional Distribution:	100	NHS:	Yes
		Letting Type:	ODOT-Let

Criteria

Controlling Criteria	(Check all that Apply)	Standard	Existing (a.)	Proposed
Lane Width	☐			
Shoulder Width	☑	10' Paved Shoulder (right side) 10' Paved shoulder ((left side), > +3 lanes	6 (right side) 10 (left side)	4 (right side at Town) 4 (left side at Town)
Horizontal Curve Radius	☐			
Maximum Grade	☐			

The Design Exception Information

The HSM Expected Crash Ramifications

Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
$N_{predicted}$ - Existing Conditions	0.1508	0.5537	0.5874	2.9200	4.2119
$N_{expected}$ - Existing Conditions	0.1508	0.5537	0.5872	2.9171	4.2088
$N_{potential\ for\ improvement}$ - Existing Conditions	0.0000	0.0000	-0.0002	-0.0029	-0.0031
$N_{expected}$ - Proposed Conditions	0.1629	0.6114	0.6483	3.1840	4.6066

PBPD = Balanced Decision

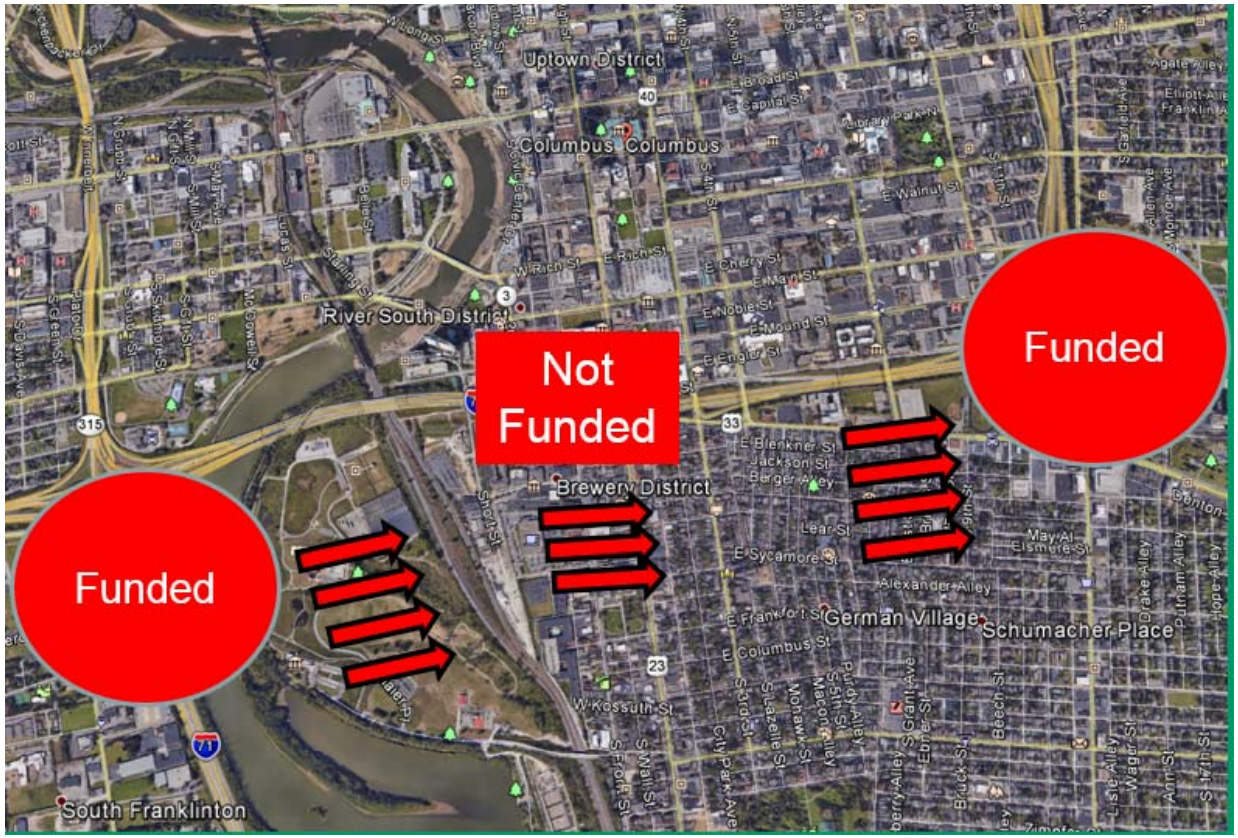
Safety, Impacts, Costs, Benefits: Is it worth it or not

EXAMPLES OF PBPD

FRA-70

- **Considerations: HCS, HSM, Truck Tracking, Drainage**

- Punch Through Requires 11’ Lanes
- Narrow Shoulders
- Provide Widest Shoulders Where Possible



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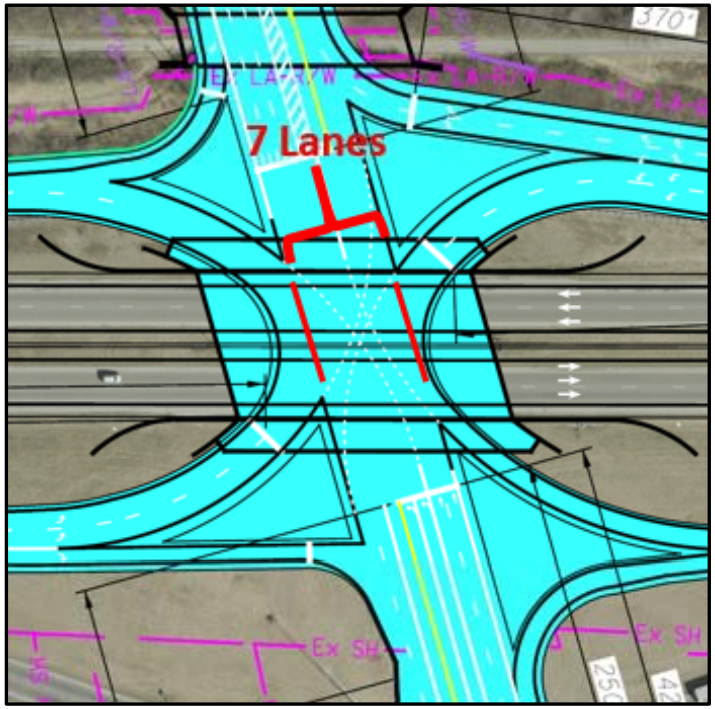
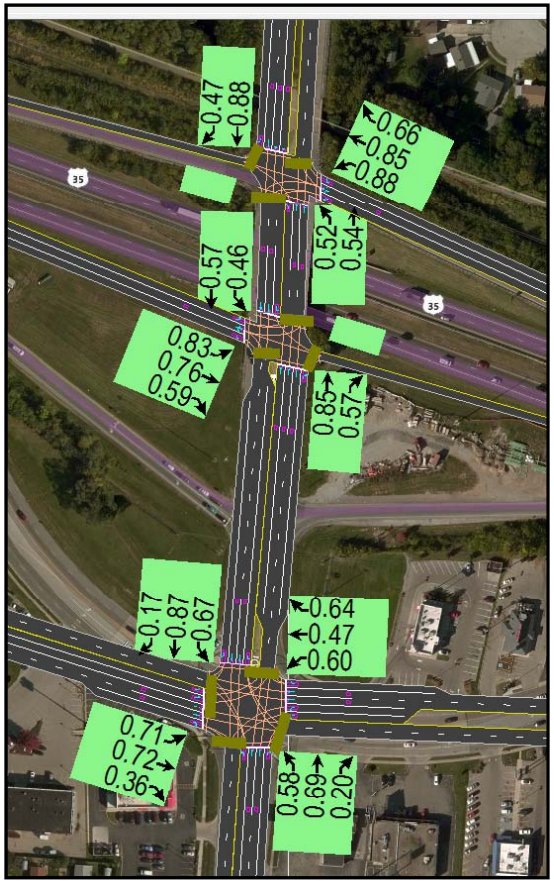
MOT-35

- **Considerations: HCS/Operations**



Preferred Alt (SPUI)

PBPD Alt (Tx Diamond)



PBPD – Is it good enough?? Way better than existing – not as good as SPUI

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GRE 35

o **Considerations: HCS/Operations, Safety**

Preferred Alt: Grade Separations = $120M

PBPD Alt: Superstreets= $15M

- Available Construction Funding = $0.0
- Superstreets far superior to existing but not as good as interchanges
- Is it better to make a “lesser” improvement now or keep waiting for $$

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HAM 75/275

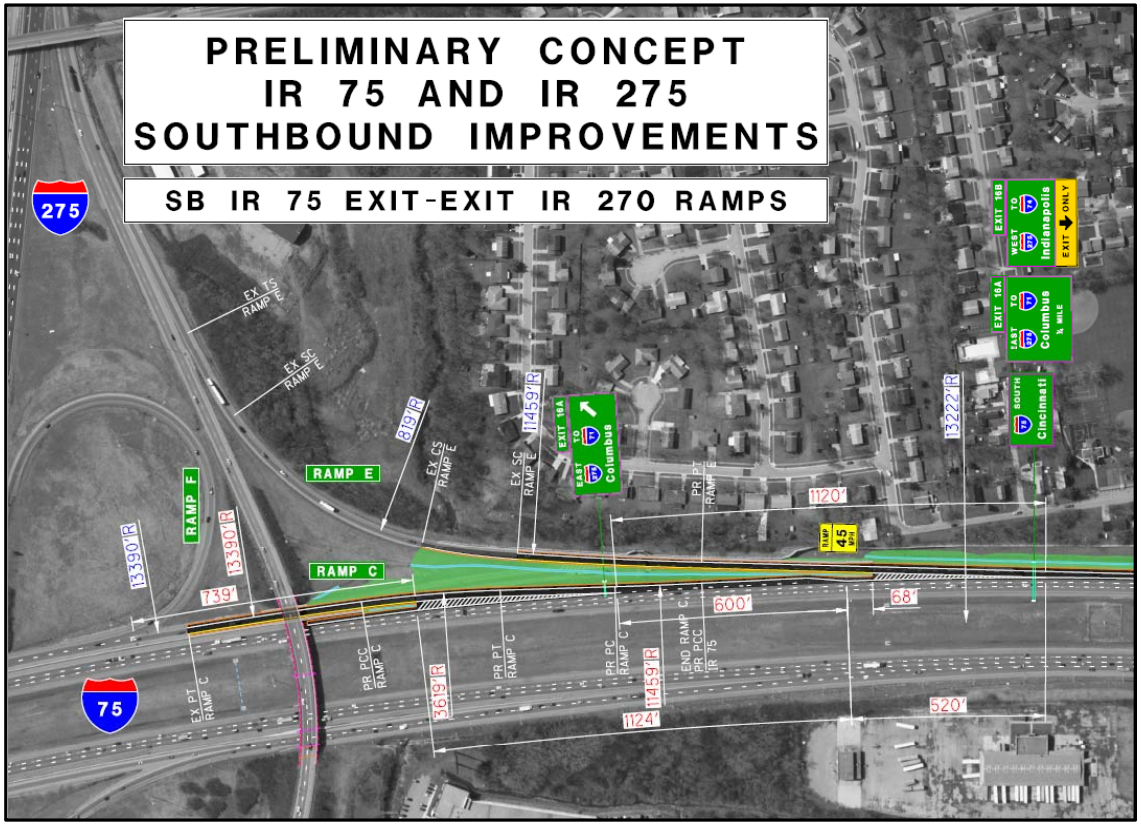
- **Considerations: HCS, Safety, Simulation**

Daily Multi-Mile Stopped SB Queues due to one lane exit

Ideal Solution is Flyover Ramp ($30M)

PBPD Solution $1.5M BUT may degrade some other areas of interchange

Is a fundable “lesser” solution better than Do Nothing??



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HAM-75

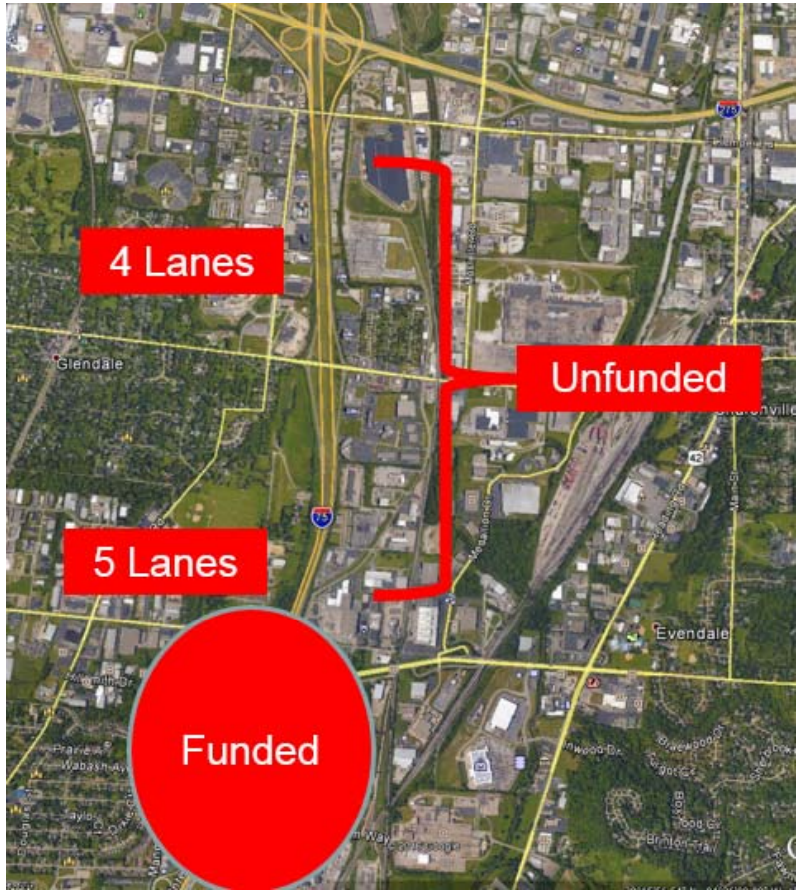
- **Considerations:** **HCS, Pavement Conditions, Overhead Clearance**

As proposed (to Standard)= $38M

PBPD = $12M

<u>Savings</u>

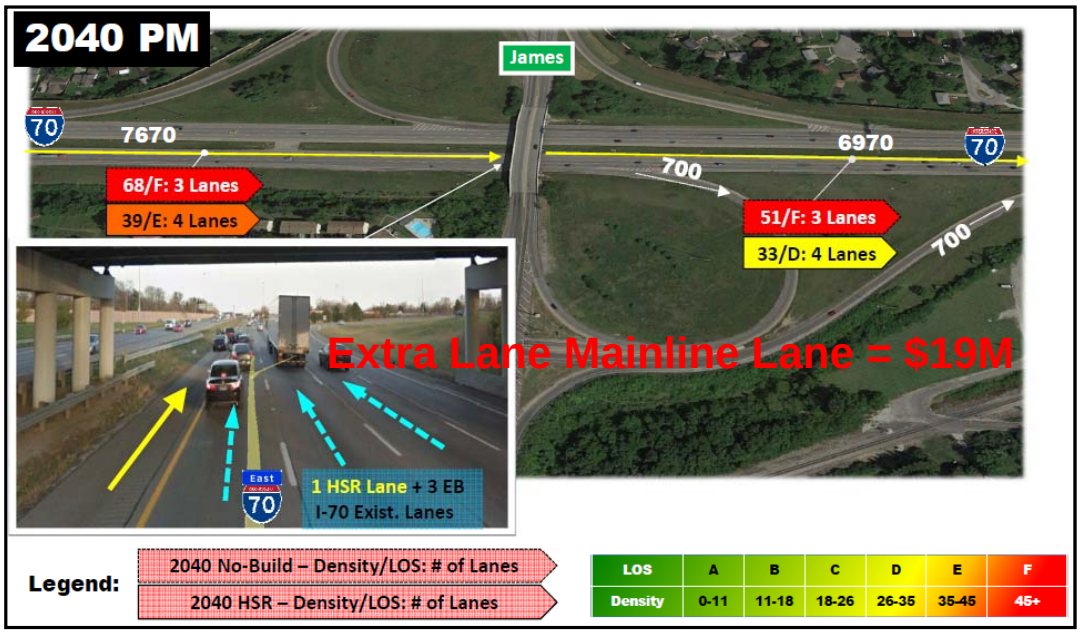
- Profile *(Salvage Pavement)*
- Surface street Mod's
- Interchange design (retained mainline bridge clearance over local street)



FRA 70

- **Considerations: Capacity, Safety**
- **Universe of deficiencies requires $180M fix (lots of Interchanges)**

Is there an affordable project that can make a significant improvement?



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SUMMARY

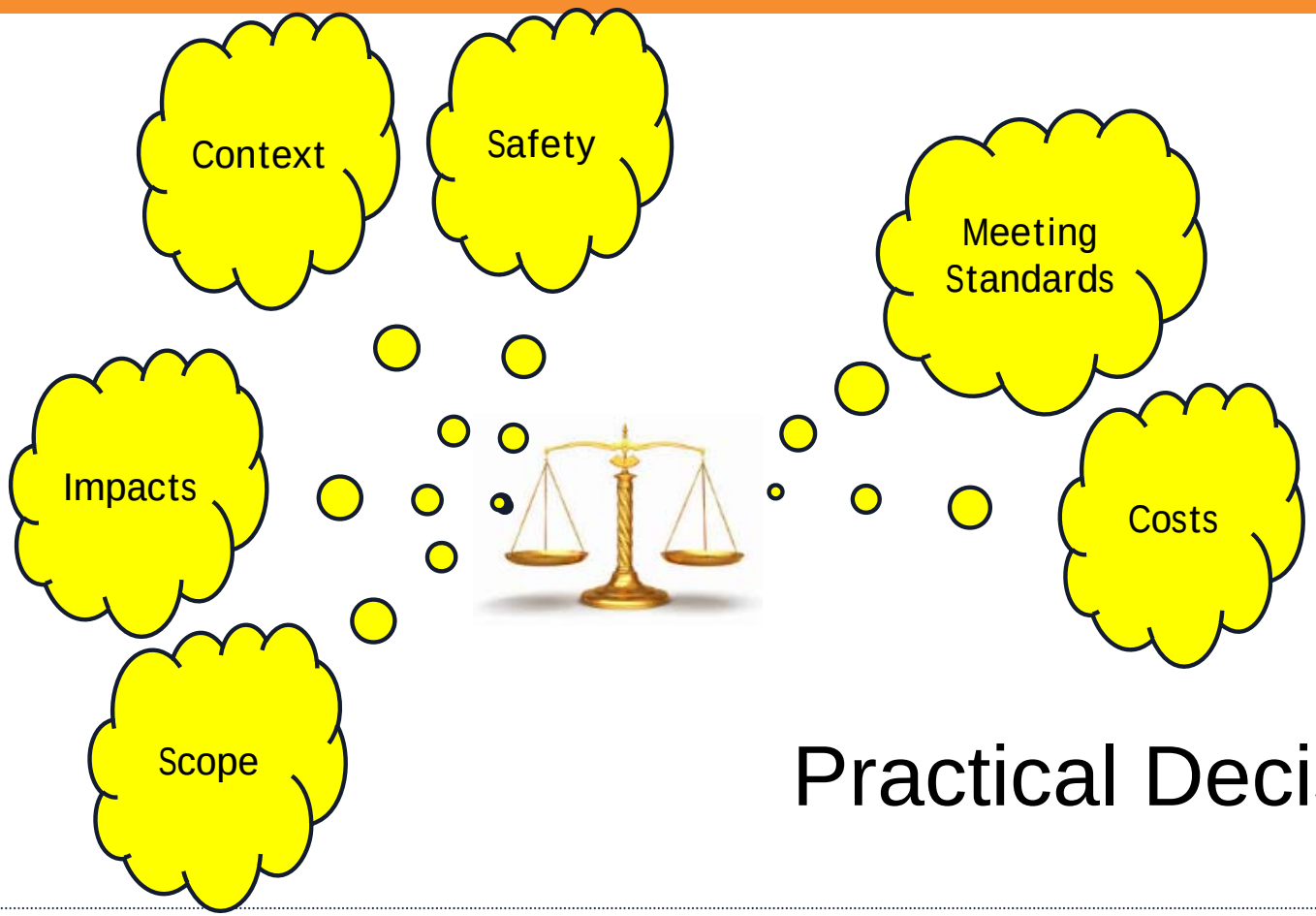
- Meeting Standards is a worthwhile goal **WHEN** it makes sense;
- *An improvement is far better than doing nothing;*

SUMMARY

- **Finally (and most important) – PBPD is a <u>balanced</u> decision:**
  - Cost
  - Impacts
  - Safety
  - Context
  - *<u>Is it an improvement</u>* (even if not full “standard”)

(i.e. - the comparative “Performance”)

SUMMARY



Practical Decision

SUMMARY

- PBPD Challenges:
  - Practical to you may be different than to me;
  - Long time design/scope paradigm to overcome;
  - PBPD is NOT Black & White (like looking up a design standard is)

And for those thinking about liability...

"We do not subscribe to the idea that new construction design standards must be met or we do nothing. We firmly believe that improvements, within the existing Right of Way, and within current funds, that may not quite meet design standards, are a definite safety enhancement and serves the motorists. We must recognize that we live in a highly litigious society and accept the fact that tort liability is part of our business. We must not allow our operations to be petrified into no activity by the specter of tort liability. Responsible actions based on reasonable conclusions are defensible." – **Bernie Hurst, Former ODOT Director, Address to the 1989 AASHTO Highway Subcommittee Annual Meeting**

- Have a Process
- Document

QUESTIONS

Dave Holstein, Administrator
ODOT Office of Roadway Engineering
dave.holstein@dot.state.oh.us
614-644-8137