

DALLAS, TX APRIL 28 - MAY 1 2025



SADDLE UP!
TEXAS 2025

EVOLUTION OF HFST PROJECTS IN KENTUCKY

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TRAFFIC SAFETY BRANCH (HSIP)

TEAM 
KENTUCKY®

TRANSPORTATION
CABINET

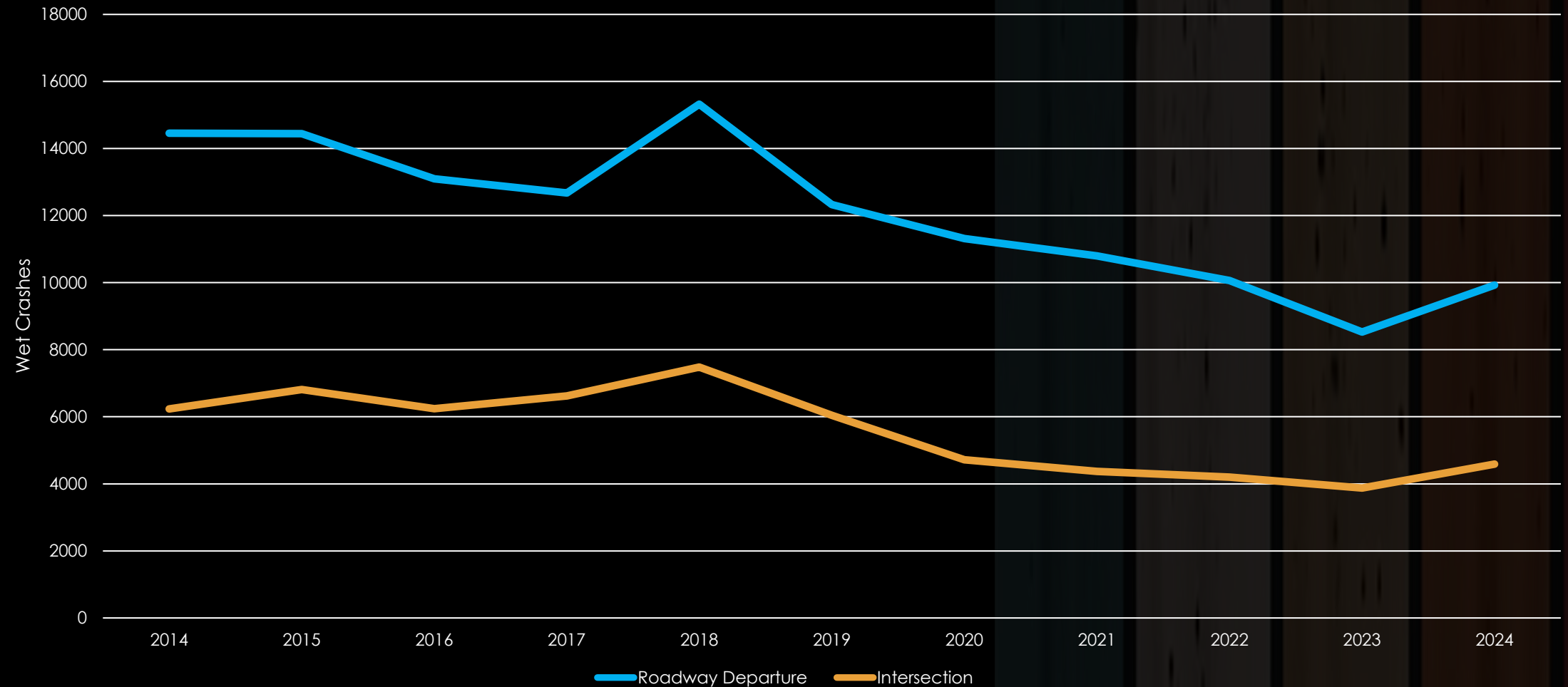


HIGH FRICTION SURFACE TREATMENT (HFST)

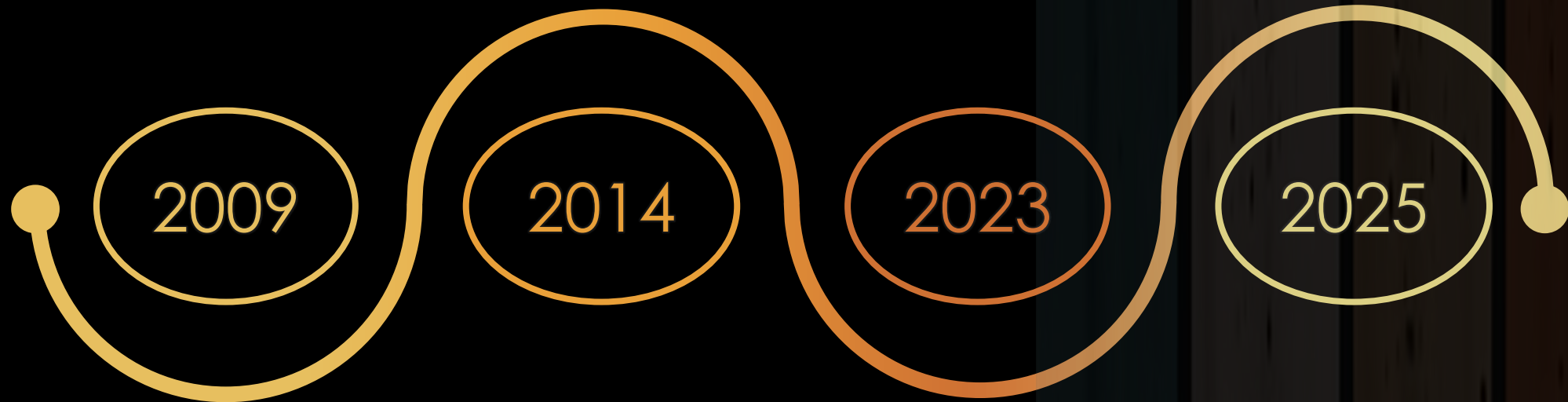
- CALCINED BAUXITE – POLISH RESISTANT AGGREGATE
- EPOXY RESIN - ADHERES AGGREGATE TO ROADWAY



KENTUCKY CRASH STATISTICS



HFST IN KENTUCKY TIMELINE



FIRST HFST PROJECT

FIRST RAMP HFST PROJECT

**FIRST INTERSECTION
HFST PROJECT**

**58% NEAR INTERSECTIONS
26% ALONG A CURVE
16% ALONG A RAMP**

FIRST SITE SELECTION METHODOLOGY



- FOCUS ON CURVES ALONG RURAL STATE ROUTES
 - AT LEAST 8 WET ROADWAY DEPARTURE CRASHES IN 5-YEAR PERIOD
- REACTIVE METHODOLOGY



OLDHAM COUNTY – KY 22



SECOND SITE SELECTION METHODOLOGY



- **SCREEN ALL STATE ROUTES AND RAMPS**
 - **SAFETY PERFORMANCE FUNCTION MODEL**
 - **WET ROADWAY DEPARTURE CRASHES**
 - **SEGMENTED BY CURVE CLASS**
- **RANKED BY EXCESS EXPECTED CRASHES**
- **FIELD REVIEW OF POTENTIAL SITES**
- **REACTIVE METHODOLOGY**



FAYETTE COUNTY – I-75 EXIT 113



THIRD SITE SELECTION METHODOLOGY



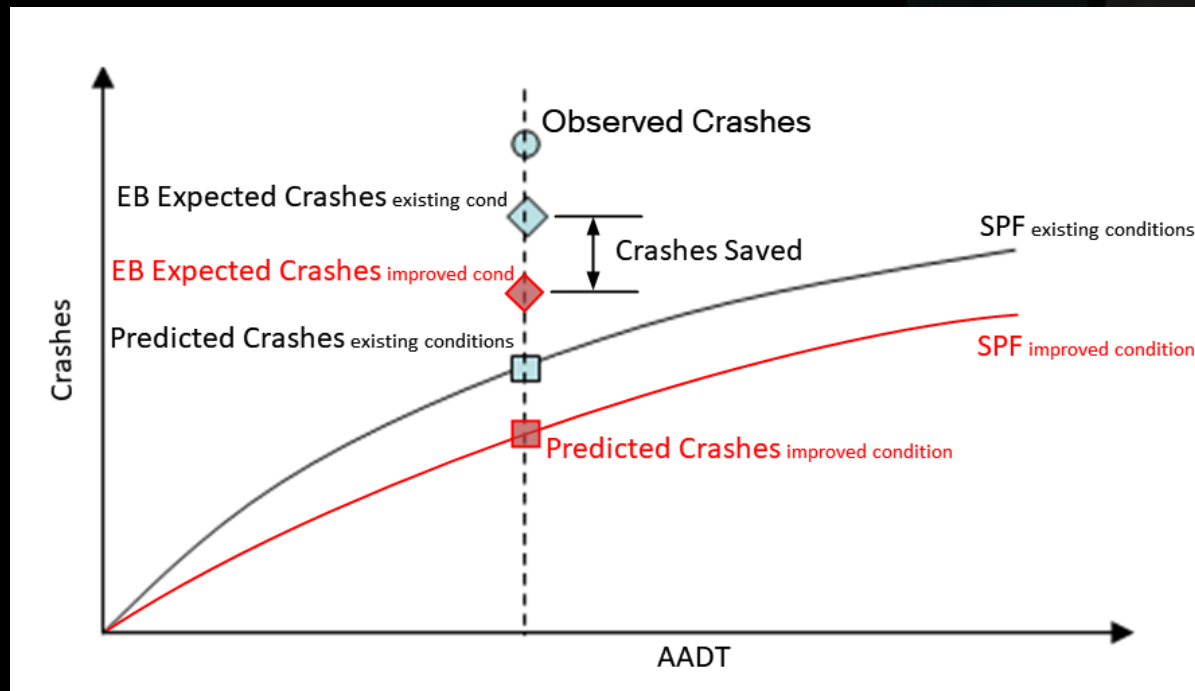
- **SCREEN ALL STATE ROUTES AND RAMPS**
 - **SAFETY PERFORMANCE FUNCTION (SPF) MODEL**
 - **INCLUDE FRICTION IN SPF MODEL**
 - **ALL CRASHES**
 - **CRASHES SAVED PREDICTIONS REPRESENT BENEFIT**
- **FIELD REVIEW OF POTENTIAL SITES**
- **PROACTIVE METHODOLOGY**



THIRD SITE SELECTION METHODOLOGY



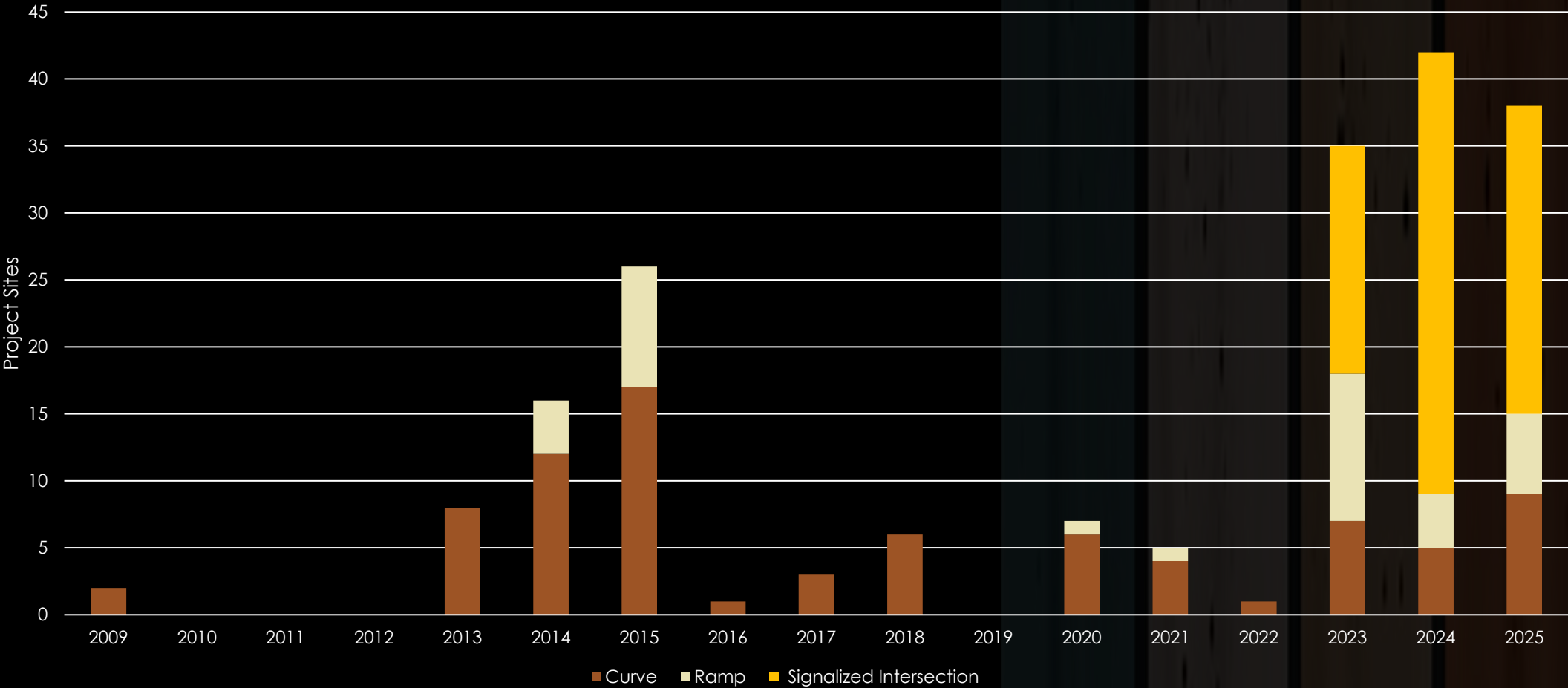
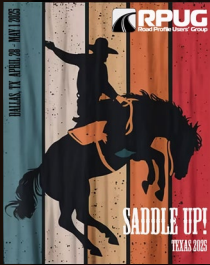
- $Expected\ Crashes_{improved} = Expected\ Crashes_{existing} * \frac{Predicted\ Crashes_{improved}}{Predicted\ Crashes_{existing}}$
- $EB\ Crashes_{Existing} = Observed\ Crashes_{existing} * Overdispersion + Predicted\ Crashes_{existing} * (1 - Overdispersion)$



JEFFERSON COUNTY – US 31W



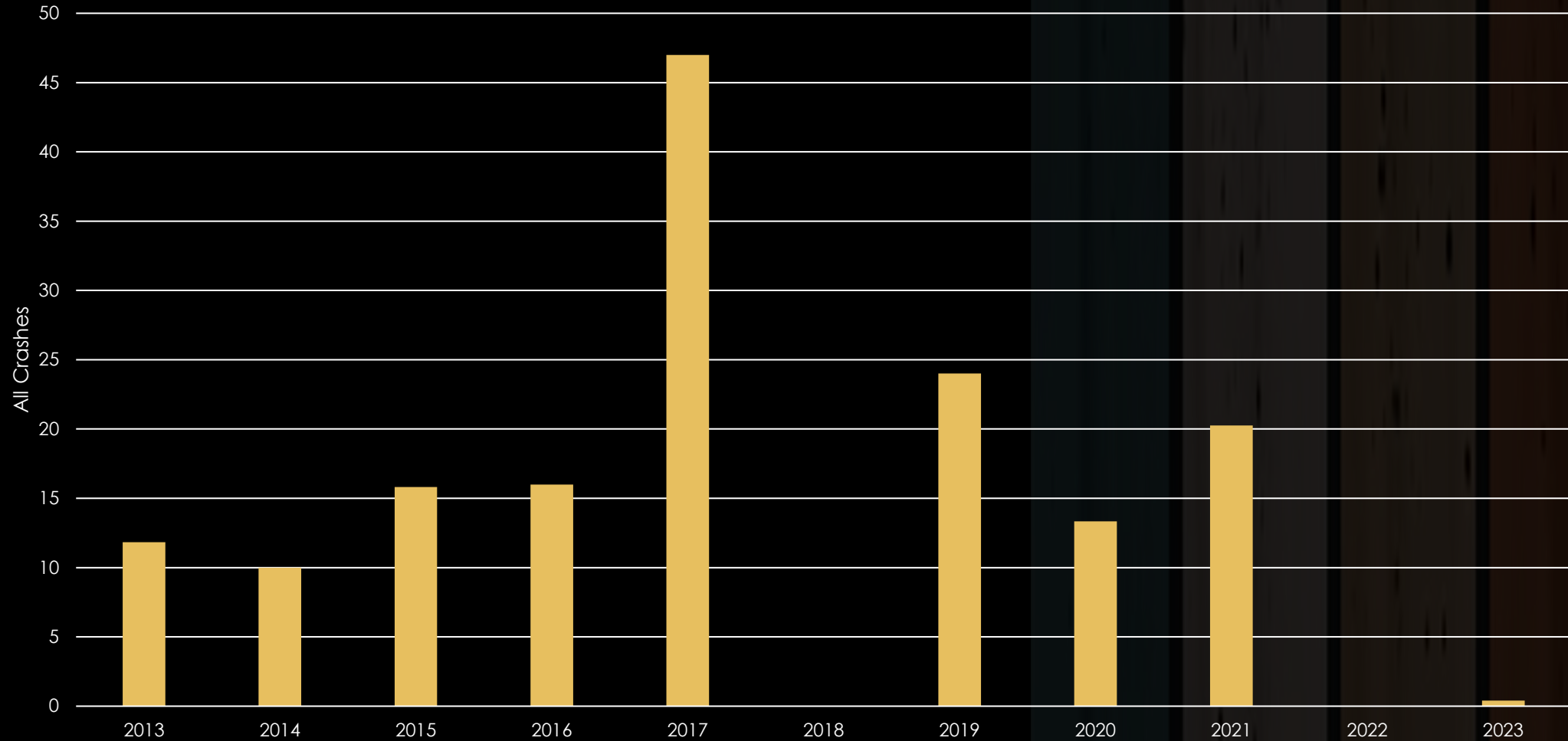
HISTORY OF HFST PROJECTS



EVALUATION OF HFST SITES (CURVES)



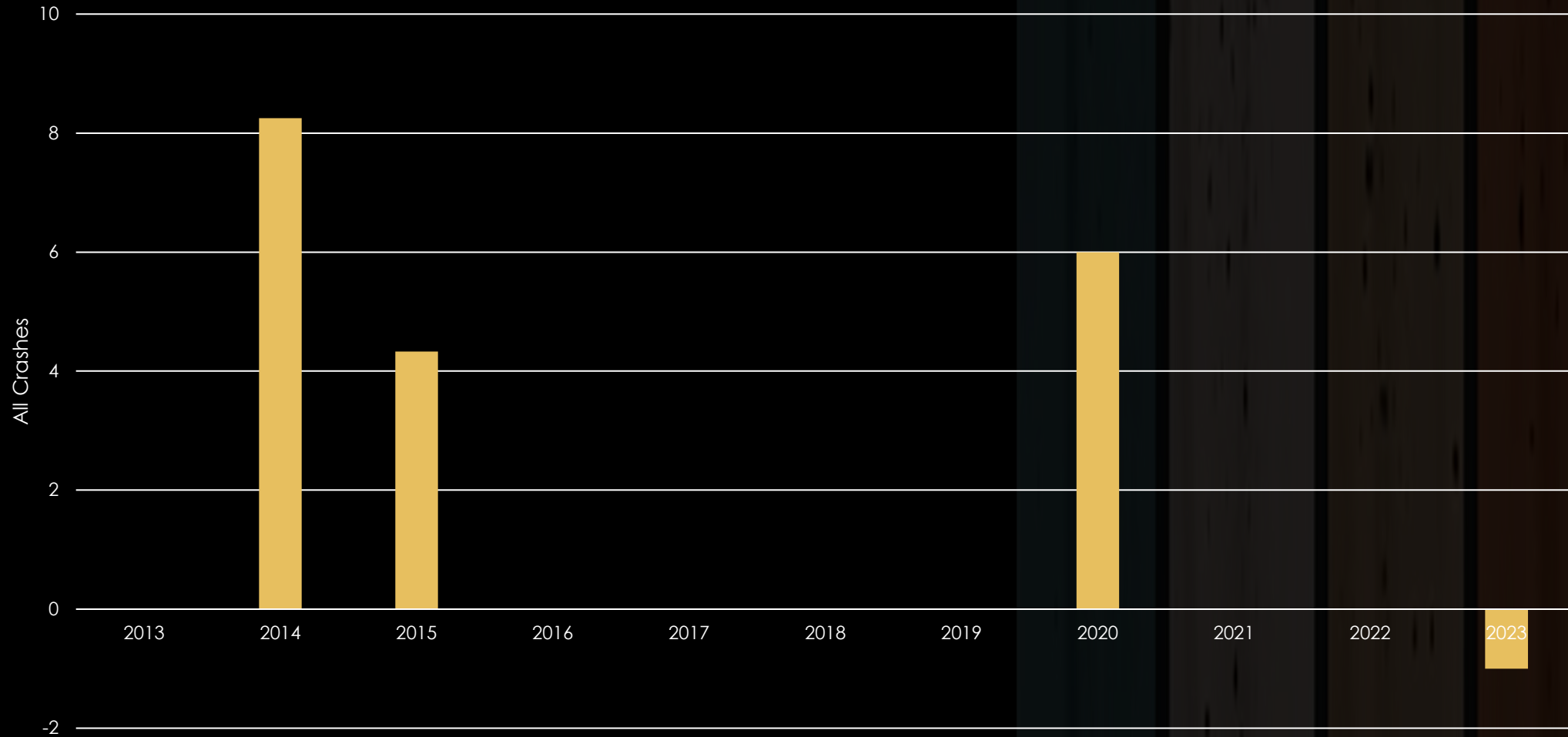
Average Crash Reduction (Curves)



EVALUATION OF HFST SITES (RAMPS)



Average Crash Reduction (Ramps)



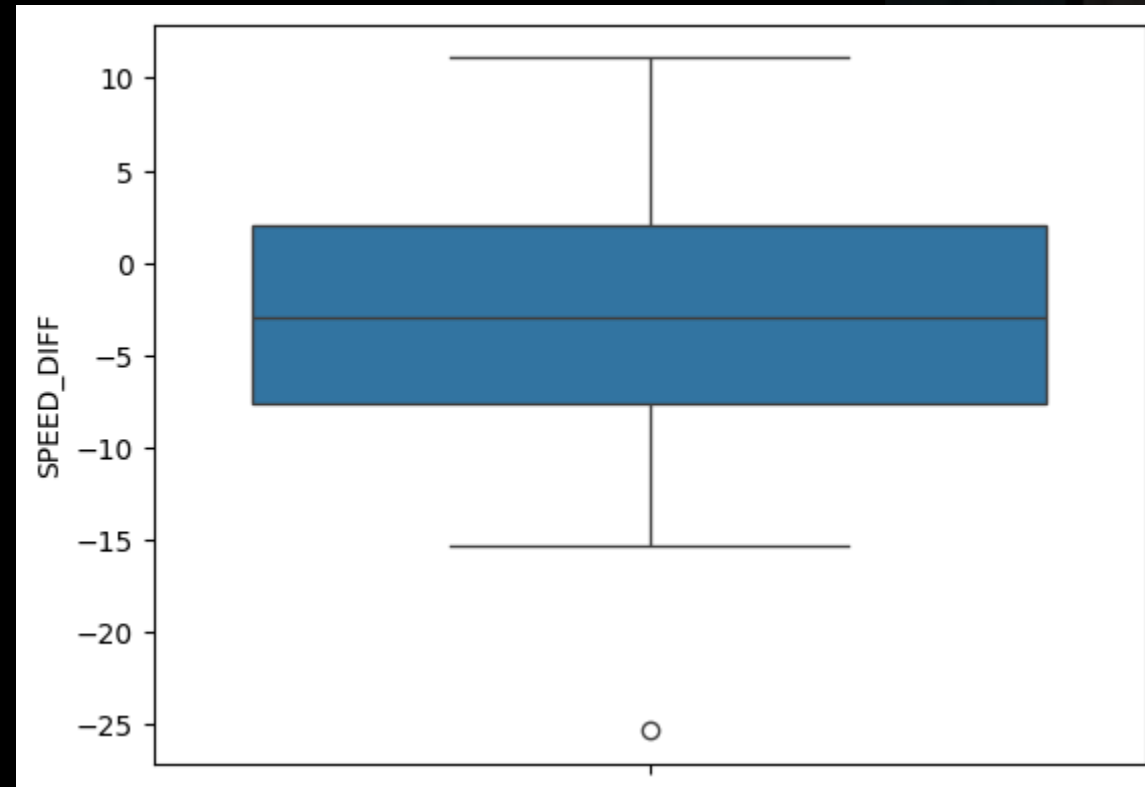
EVALUATION OF HFST SITES (SIGNALS)



- **ONLY HAVE 2023 SITES TO EVALUATE**
 - **ON AVERAGE 1.13 CRASHES REDUCED PER SITE**
 - **AVERAGE CRASH REDUCTION OF 0.4 FOR 2023 CURVE HFST SITES**
- **PENNDOT GAYAH ET AL. 2023**
 - **ALL CRASHES NEAR INTERSECTIONS REDUCED 66% AFTER HFST INSTALLATION**
 - **LIMITED SAMPLE SIZE**

EVALUATION OF HFST SITES (SPEED)

- **AVERAGE DRIVER TRAVELED 3.5 MPH SLOWER AFTER HFST WAS INSTALLED**
- **A LITTLE NOISY BUT CAN INFER THAT HFST IS NOT CAUSING DRIVERS TO SPEED UP**



SUMMARY

- **FRICTION REDUCES MORE THAN WET ROADWAY DEPARTURE CRASHES**
 - **DO NOT FOCUS SOLELY ON CURVES**
- **PROACTIVE SITE SELECTION**
 - **SAFETY PERFORMANCE FUNCTION WITH CONTINUOUS FRICTION DATA**
 - **IDENTIFY RISK BEFORE CRASHES OCCUR**
- **HFST DID NOT INDUCE HIGHER SPEEDS IN KENTUCKY**



POTENTIAL IMPROVEMENTS

- CONTINUE EVALUATION FEEDBACK LOOP
- TEST ALTERNATIVE FRICTION ENHANCING PROJECTS
- ONLY USE HFST WHEN A SPECIFIC FRICTION DEMAND THRESHOLD IS MET



PARTNERS

wsp

