

# Bridge, Pavement, and System Performance Measures

—and—

## Asset Management *Final Rules Overview*

October 2017



U.S. Department of Transportation  
**Federal Highway Administration**

# Establishment and Reporting of Targets

Following slides applies to

- Bridge Measures
- Pavement Measures
- System Performance Measures



# Establishment of Performance Targets – State DOTs (490.105)

- First set of targets within 1 year of the effective date of the final rule: May 20, 2018.
- Target required for each performance measure
- Targets must be reported to FHWA by October 1, 2018.
- Each Performance Period: Cover 4 years
  - (2018-2021); (2022-2025), etc.
  - 2-year targets
  - 4-year targets



# Establishment of Performance Targets – State DOTs (490.105)

- Established targets:
  - Reflect the state investment strategies described in the state Asset Management Plan (490.107(b)(1)(ii)(C); 515.7(e); 515.9(g))
    - » Performance gap analysis (actual condition vs. expected target)(515.7(a))
    - » Life-cycle planning (minimizing the life-cycle cost while achieving expected targets, under budget constraint) (515.7(b))



# Establishment of Performance Targets – MPOs (490.105)

- Establish 4-year targets by supporting the State DOT target or establishing a quantifiable target
  - Establish targets within 180 days relevant State DOT(s) establish targets
  - Due Nov 16, 2018 (or earlier if FDOT establishes prior to May 20, 2018)
  - A multistate planning area -may choose different target establishment options for the portion of the planning area within each State



# State Reporting on Performance Targets (490.107)

- Baseline Performance Period Report
  - Baseline performance measures
  - 2- and 4-year established performance targets
- Mid Performance Progress Report
  - 2-year PMs vs. 2-year targets
- Final Performance Progress Report
  - 4-year PMs vs. 4-year targets



# State Reporting on Performance Targets (490.107)

- FHWA reviews the reports
  - For significant progress determination
    - » The actual condition is better than the baseline condition, or
    - » The actual condition is equal to or better than the established target
- If progress is not made for a target:
  - State DOT shall take action to achieve target

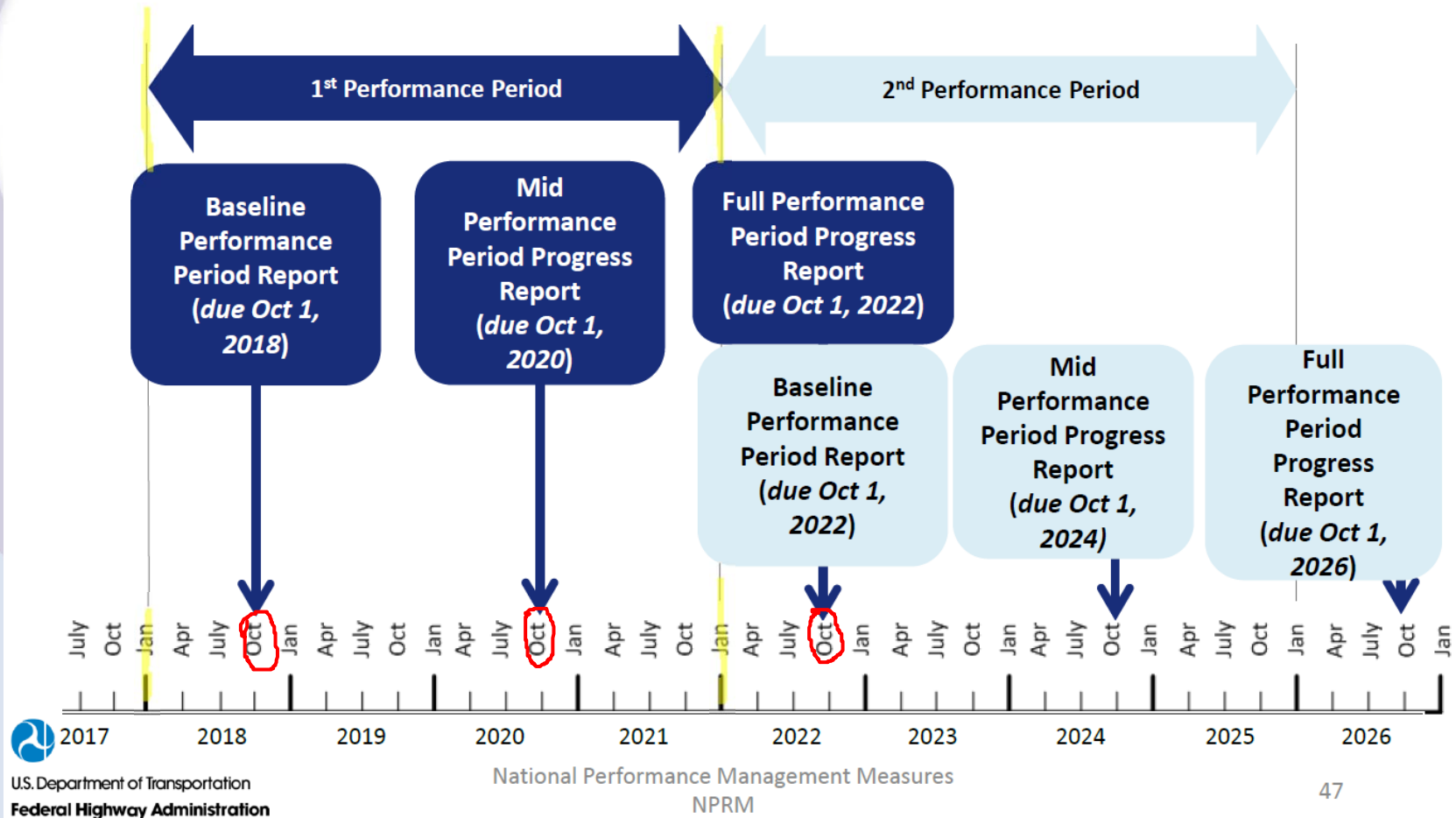


# MPO Reporting on Performance Targets (490.107)

- Reporting includes:
  - » Targets to respective State DOT(s) in a manner that is documented and mutually agreed upon by both parties
  - » Baseline level and progress toward targets in Metropolitan Transportation Plan
  - » Do not need to send to FHWA



# Timeline for performance periods and biennial reporting



# Performance Measures on NHS Bridges



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# Final Rule 490 Subpart D

- Effective date: May 20, 2017
- Only covers NHS Bridges
  - Includes bridges on- and off-ramps connected to the NHS



# Calculating NHS Bridge Condition Performance Measures (490.409)

|                                 | Structure Type                                                        |                                       |                                                             |
|---------------------------------|-----------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------|
|                                 | Bridges                                                               | Culverts                              |                                                             |
| Overall Bridge Condition Rating | 3 metric classification (58-Deck, 59-Superstructure, 60-Substructure) | 1 metric classification (62-Culverts) | Measures                                                    |
| ✓ Good                          | All metrics rated "Good"                                              | Metric rated "Good"                   | → percentage of deck area classified as in "Good" condition |
| ✓ Poor                          | Any metric rated "Poor"                                               | Metric rated "Poor"                   | → percentage of deck area classified as in "Poor" condition |
| ✗ Fair                          | Minimum rated metric "Fair"                                           | Metric rated "Fair"                   |                                                             |



# Pavement Measures



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# Pavement Measures

| Pavement Condition Measures                                               |                                                                            |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Interstate System                                                         | Non-Interstate NHS                                                         |
| Percentage of pavements of the Interstate System in <b>Good</b> condition | Percentage of pavements of the non-Interstate NHS in <b>Good</b> condition |
| Percentage of pavements of the Interstate System in <b>Poor</b> condition | Percentage of pavements of the non-Interstate NHS in <b>Poor</b> condition |



## ***Data Needed for Calculating the National Pavement Measures***

### **Condition Data:**

- Roughness (IRI)
- Rutting (asphalt pavements only)
- Cracking
- Faulting (concrete pavements only)
- Can use Present Serviceability Rating (PSR) only where speed limit < 40 mph



## ***Pavement Condition Thresholds***

|                      | Good  | Fair                                        | Poor                                     |
|----------------------|-------|---------------------------------------------|------------------------------------------|
| IRI<br>(inches/mile) | <95   | 95-170                                      | >170                                     |
|                      |       |                                             |                                          |
| Rutting<br>(inches)  | <0.20 | 0.20-0.40                                   | >0.40                                    |
|                      |       |                                             |                                          |
| Faulting<br>(inches) | <0.10 | 0.10-0.15                                   | >0.15                                    |
|                      |       |                                             |                                          |
| Cracking<br>(%)      | <5    | 5-20 (asphalt)<br>5-15 (JCP)<br>5-10 (CRCP) | >20 (asphalt)<br>>15 (JCP)<br>>10 (CRCP) |



# Key Deadlines & Dates

## *Pavement TPM Regulations: Required Data Reporting*

| Roughness,<br>Cracking,<br>Rutting,<br>Faulting | Interstate                                  | Non-Interstate                              |                  |
|-------------------------------------------------|---------------------------------------------|---------------------------------------------|------------------|
|                                                 | <b>April 15</b>                             | June 15                                     | <i>Due Date</i>  |
|                                                 | <b>Every Year</b>                           | 2 Years                                     | <i>Frequency</i> |
|                                                 | <b>Full Extent</b><br>1 Lane<br>1 Direction | <b>Full Extent</b><br>1 Lane<br>1 Direction | <i>Coverage</i>  |



# Data Sources

## HPMS Field Manual (State DOTs report for each pavement section)

|                    | Condition Metrics*                                | Inventory Data Elements                         | Effective Date  |
|--------------------|---------------------------------------------------|-------------------------------------------------|-----------------|
| Interstate System  | IRI,<br>Rutting,<br>Faulting,<br>Cracking Percent | Through Lanes<br>Surface Type<br>Structure Type | January 1, 2018 |
| Non-Interstate NHS | IRI,<br>Rutting,<br>Faulting,<br>Cracking Percent | Through Lanes<br>Surface Type<br>Structure Type | January 1, 2020 |

*\*Per the existing HPMS Field Manual, only IRI and the inventory data elements are currently required for all segments of the NHS. This requirement changes on the effective date shown.*



## ***Pavement TPM Regulations: Minimum Condition and Penalty***

Minimum Condition Level: % of lane-miles of **Interstate System** in poor condition shall not exceed 5.0%

*FHWA will assess the minimum condition level annually using data in HPMS as of June 15*

Penalty: If minimum is not met, State must obligate more of NHPP funds and transfer some of STP funds to Interstate Program in next fiscal year



# Systems Performance Measures



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# Final Measures: System Performance and Freight

| Measure Area                                              | Performance Measures                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Performance of the National Highway System<br>(Subpart E) | <ul style="list-style-type: none"><li>• <b>Interstate Travel Time Reliability Measure:</b> Percent of person-miles traveled on the Interstate that are reliable</li><li>• <b>Non-Interstate Travel Time Reliability Measure:</b> Percent of person-miles traveled on the non-Interstate NHS that are reliable</li></ul> |
| Freight Movement on the Interstate System<br>(Subpart F)  | <ul style="list-style-type: none"><li>• <b>Freight Reliability Measure:</b> Truck Travel Time Reliability (TTTR) Index</li></ul>                                                                                                                                                                                        |

Note: These measures contribute to assessing the National Highway Performance Program (NHPP) and National Highway Freight Program (NHFP)



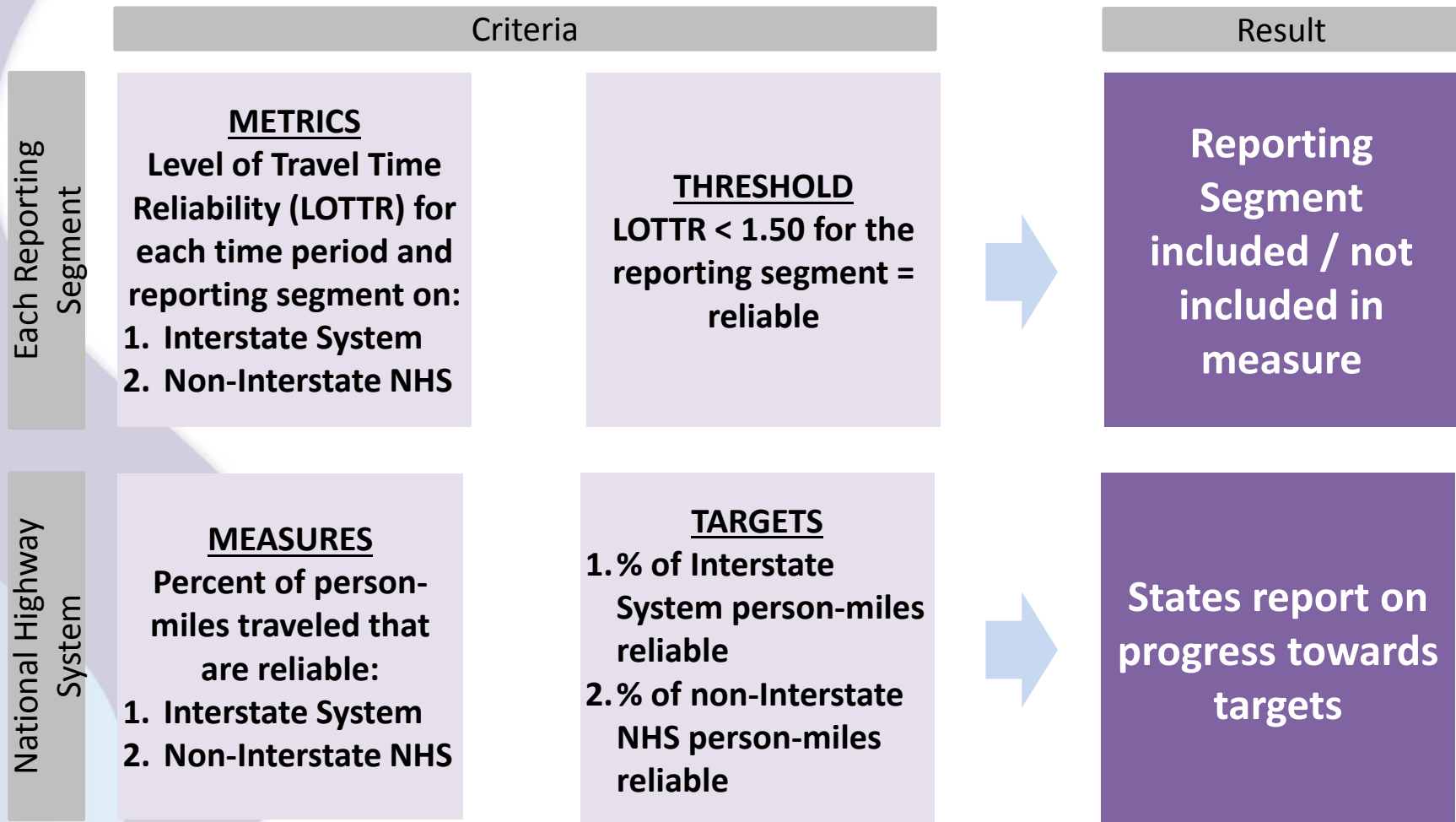
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## GHG Measure Delayed

- While the rule took effect on May 20, 2017, certain portions of the rule pertaining to the GHG measure (the percent change in CO<sub>2</sub> emissions from 2017, generated by on-road mobile sources on the NHS) have been delayed indefinitely.
- FHWA will be publishing a NPRM in the *Federal Register* pertaining to the GHG measure.



# § 490.507 Travel Time Reliability Measures



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Safe Roads for a Safer Future  
Investment in roadway safety saves lives



## § 490.509 Travel Time Reliability Data Sources

| Relevant Data                                                                                                                 | Data Source(s)                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• <b>Travel times</b></li><li>• <b>NHS travel time segments</b></li></ul>               | <ul style="list-style-type: none"><li>• National Performance Management Research Data Set (NPMRDS) , <b>OR</b></li><li>• Equivalent data set</li></ul> |
| <ul style="list-style-type: none"><li>• <b>AADT/volumes</b></li><li>• <b>Annual traffic volume</b><br/>(AADT x 365)</li></ul> | <ul style="list-style-type: none"><li>• Highway Performance Monitoring System (HPMS)</li></ul>                                                         |
| <ul style="list-style-type: none"><li>• <b>Occupancy factors</b></li></ul>                                                    | <ul style="list-style-type: none"><li>• Provided by FHWA, likely based on national surveys, <b>OR</b></li><li>• Other allowed data sources</li></ul>   |

# § 490.509 Travel Time Reliability

## Applicable Time Periods

Full Year (Jan 1-Dec 31)



Weekdays (Mon – Fri)

6 – 10am

10am – 4pm

4 – 8pm

Weekends

6am – 8pm

Four Total Time Periods

## § 490.511 Level of Travel Time Reliability (LOTTR) Metric (Example)

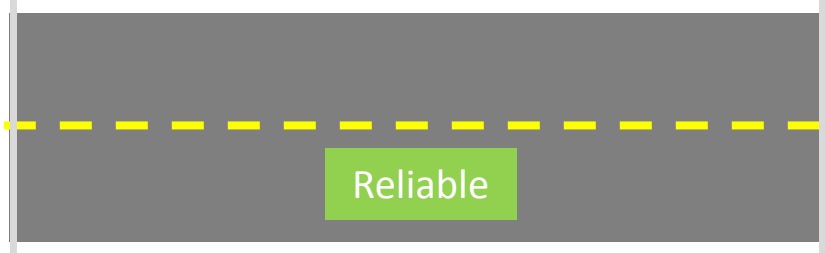
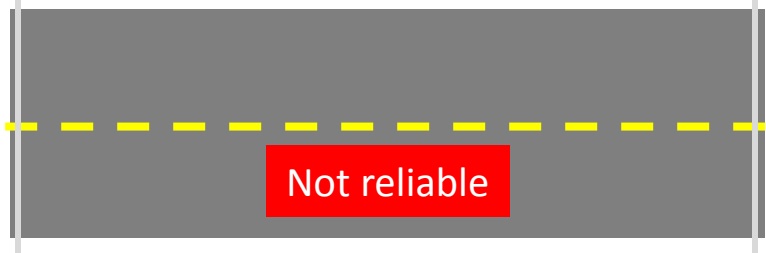
$$\frac{\text{Longer Travel Time (80th)}}{\text{Normal Travel Time (50th)}} = \frac{\# \text{ seconds}}{\# \text{ seconds}} = \text{Level of Travel Time Reliability Ratio}$$

| Level of Travel Time Reliability (LOTTR)<br>(Single Segment, Interstate Highway System) |            |                                                        |
|-----------------------------------------------------------------------------------------|------------|--------------------------------------------------------|
| Monday – Friday                                                                         | 6am – 10am | LOTTR = $\frac{44 \text{ sec}}{35 \text{ sec}} = 1.26$ |
|                                                                                         | 10am – 4pm | LOTTR = 1.39                                           |
|                                                                                         | 4pm – 8pm  | LOTTR = 1.54                                           |
| Weekends                                                                                | 6am – 8pm  | LOTTR = 1.31                                           |
| Must exhibit LOTTR below 1.50 during <u>all</u> of the time periods                     |            | <b>Segment <u>is not</u> reliable</b>                  |

**HPMS Submittal:** Starting in 2018, State DOTs report LOTTR metrics and the corresponding 80<sup>th</sup> and 50<sup>th</sup> percentile times for each time period and directional AADT for each reporting segment by June 15 of each year, for the previous year's measures



## § 490.513 Calculating Travel Time Reliability Measures (Example)

|                                                                                      |                                                                                    |                                                                                     |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                      |  |  |
| Length                                                                               | 1.000 mi.                                                                          | 0.750 mi.                                                                           |
| Annual Traffic Volume                                                                | X<br>2,000,000                                                                     | X<br>3,500,000                                                                      |
| Occupancy Factor                                                                     | X<br>1.3 persons/vehicle                                                           | X<br>1.7 persons/vehicle                                                            |
| Segment Total                                                                        | <b>Reliable: 2,600,000 person-miles</b>                                            | <b>Unreliable: 4,462,500 person-miles</b>                                           |
| $\frac{\Sigma \text{ (Reliable person-miles)}}{\Sigma \text{ (Total person-miles)}}$ |                                                                                    |                                                                                     |

**Measure:** % of person-miles reliable, for full extent of the system



## § 490.609 Freight Reliability Data Sources

### Relevant Data

- Truck travel times
- Interstate travel time segments

### Data Source Options

- NPMRDS, ***OR***
- Equivalent data set

# § 490.609 & 490.611 Freight Reliability

## Applicable Time Periods

Full Year (Jan 1-Dec 31)



Weekdays (Mon – Fri)

**6 – 10am**

**10am – 4pm**

**4 – 8pm**

Overnight (all days)  
**8pm – 6am**

Weekends

**6am – 8pm**

Five Total Time Periods

# Final Measures: CMAQ Program

| Measure Area                                                                     | Performance Measures                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measures to Assess the CMAQ Program – Traffic Congestion (Subpart G)             | <ul style="list-style-type: none"><li>• <b>Peak Hour Excessive Delay(PHED) Measure:</b> Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita</li><li>• <b>Non-Single Occupancy Vehicle Travel (SOV) Measure:</b> Percent of Non-Single Occupancy Vehicle (SOV) Travel</li></ul> |
| Measure to Assess the CMAQ Program – On-Road Mobile Source Emissions (Subpart H) | <ul style="list-style-type: none"><li>• <b>Emissions Measure:</b> Total Emissions Reduction</li></ul>                                                                                                                                                                                  |

*N/A for Florida*



# Asset Management



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**Federal Highway Administration**

# Asset Management Goal

- Maintain the highway infrastructure asset system in a state of good repair
- Manage network for the long term at the minimum practical cost to:
  - Improve or Preserve asset condition and system performance
  - Manage risk
- Short-term performance target are key indicators



## Key Requirements

- Each State DOT must develop a Transportation Asset Management Plan (TAMP) for the NHS to improve or preserve the condition of the assets and the performance of the NHS
- TAMP must cover a 10-year period



# Key DEADLINES & Dates

- By April 30, 2018: State must submit risk-based **initial** TAMP
- **By June 30, 2019: State must submit fully compliant TAMP**
- Every 4 years thereafter: Recertification for updates
- **By July 31 each year: Annual Determination by FHWA**
- October 1, 2019 and each year: If TAMP not developed and implemented, Federal share on NHPP will be reduced to 65% in that fiscal year.



# Risk-Based TAMP

## Key Plan Contents:

- Pavement and bridge inventory and conditions on the NHS
- Objectives, measures, and targets
- Performance gap identification
- Lifecycle Planning
- Risk Management Analysis
- Financial Plan
- Investment Strategies



## For Additional Information



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