Delaware Transportation Performance Measurement

Travel Time-Based Measures from: FHWA’s System Performance, Freight, and CMAQ Performance Measures Final Rule (PM 3)

December 5, 2018
## Background – 17 Total Measures (PM1 to PM3)

<table>
<thead>
<tr>
<th>Final Rule</th>
<th>Measures</th>
</tr>
</thead>
</table>
| **PM1** Safety | • # of fatalities  
• Rate of fatalities (per MVM)  
• # of serious injuries  
• Rate of serious injuries (per MVM)  
• # of non-motorized fatalities and non-motorized serious injuries |
| **PM2** Infrastructure | • % of pavements of the Interstate System in Good condition  
• % of pavements of the Interstate System in Poor condition  
• % of pavements of the non-Interstate NHS in Good condition  
• % of pavements of the non-Interstate NHS in Poor condition  
• % of NHS bridges classified as in Good condition  
• % of NHS bridges classified as in Poor condition |
| **PM3** System Performance, Freight, and CMAQ | • % of person-miles on the Interstate that are Reliable  
• % of person-miles on the non-Interstate NHS that are Reliable  
• Truck Travel Time Reliability (TTTR) Index  
• Annual Hours of Peak Hour Excessive Delay (PHED) per capita  
• % of Non-Single Occupancy Vehicle (SOV) Travel  
• Total Emissions Reduction |

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17 measures per 23 CFR 490, excluding a deferred GHG Measure

PM3 Rule’s effective date: May 20, 2017  
State DOT targets due: May 20, 2018  
MPO targets due: 180 days after DOT  
Baseline Performance Period Report due: October 1, 2018

"2016"  
"2017"  
"2018"
Data Review – NPMRDS Data

What is NPMRDS?

*National Performance Management Research Data Set*

- Archived speed and travel time dataset covering the National Highway System
- Sourced from INRIX probe-based data (reported from vehicles, trucks, and mobile devices)
- Compiled in 5-minute intervals for passenger vehicles, trucks, and combined
- Referenced to roadway segments by Traffic Message Channel (TMC); over 1,100 TMC segments in Delaware
PM3 widget set compliant with MAP-21

1. Geography \[(\text{State, MPA, UZA})\]
2. Measures \[(\text{TTR}_i, \text{TTR}_{NI}, \text{TTTR}, \text{PHED})\]
3. Year \[(2017)\]
4. Data Style \[(\text{graph, map})\]

**DE Posted Speed Limits (for PHED calcs) processed by CATT Lab**

**Historic 2011-2017 data (for trendlines) pulled by WILMAPCO**
How is NPMRDS Data Used?

1) Data for "This Year" (2017, 2018, 2019, etc.)
2) Recent Historic Trends
3) Future Trend Estimates

Examples of Targets:
- Data Trending “Downward”
  - THIS YEAR
  - 2-YR TARGET
  - 4-YR TARGET
  - SAME AS EXISTING
  - FOLLOW THE TREND
  - LESS THAN TREND
How is NPMRDS Data Used?

Examples of Targets:
Data Trending “Upward”

- THIS YEAR
- 2-YR TARGET
- 4-YR TARGET

Options:
- MORE THAN TREND
- FOLLOW THE TREND
- SAME AS EXISTING
What do 50th vs. 80th vs. 95th percentile travel times look like?

Example 1 (DE 1 SB, 6-10 AM Peak):
50th Percentile = 7.15 min (56 mph)
80th Percentile = 7.39 min (54 mph)
95th Percentile = 7.76 min (52 mph)

TT Difference = ± 0.61 minutes
Approx. Speeds = 52-56 mph
Approx. LOTTR = 1.03 to 1.08

Source: DelDOT Bluetooth travel times (June-August 2015), as compiled by Rybinski Engineering
Travel Time Reliability (Interstate)

Interstate Travel Time Reliability for Delaware

MAP-21 Percent of the Person-Miles Traveled on the Interstate That Are Reliable (the Interstate Travel Time Reliability measure)

2017 Target
at least
75.0%

Year-to-Date
2017

Target: At least 75% of the system should have a LOTTR less than 1.50

Example of Trends:
Travel Time Reliability, by Month

Show map...
Travel Time Reliability (Interstate)

Example of Trends: Travel Time Reliability, by Road Segment
Travel Time Reliability (Interstate)

Historic Data Insights by Month

*Highly variable by month (limited mileage?)*

![Graph showing TTR by month with significant variation.]

*Reflective of seasonal travel*

![Graph showing TTR by month with peaks and troughs corresponding to different times of the year.]

- **2017 Avg 80.1%**
- **> 90%**
- **67%**
Travel Time Reliability (Interstate)

Historic Data Insights by Year

General downward trend since 2012

Influenced by I-495 Closure (Jun-Aug 2014)
Variations by Urbanized Area

**WILMAPCO Area**  
\[ \text{TTR}_{NI} = 86.8\% \]

**Dover / Kent County MPO Area**  
\[ \text{TTR}_{NI} = 97.9\% \]

**Salisbury-Wicomico MPO Area**  
\[ \text{TTR}_{NI} = 98.3\% \]
Travel Time Reliability (Non-Interstate NHS)

Historic Data Insights by Month

More stable than Interstates (more mileage?)

Less variation (than interstate data) by season; Potential re-baselining with v2 versus v1 data
### Example of Trends:

**Truck Travel Time Reliability, by Month**

<table>
<thead>
<tr>
<th>Month</th>
<th>Reliability Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>1.50</td>
</tr>
<tr>
<td>Feb</td>
<td>1.50</td>
</tr>
<tr>
<td>Mar</td>
<td>1.50</td>
</tr>
<tr>
<td>Apr</td>
<td>2.05</td>
</tr>
<tr>
<td>May</td>
<td>1.75</td>
</tr>
<tr>
<td>Jun</td>
<td>2.00</td>
</tr>
<tr>
<td>Jul</td>
<td>2.00</td>
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<tr>
<td>Aug</td>
<td>2.00</td>
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<td>Sep</td>
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<td>Oct</td>
<td>2.00</td>
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<td>Nov</td>
<td>2.00</td>
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<tr>
<td>Dec</td>
<td>2.00</td>
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</tbody>
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**2017 Target:**
- Less than 2.50

**Year-to-Date 2017:**
- 2.05

**Target:** The system should have a TTTR less than 2.50

Data source: NPMRDS IN

*Updated May 3, 2018 4:00 PM*
Example of Trends:
Truck Travel Time Reliability, by Road Segment
Freight Reliability

Historic Data Insights by Month

More stable than passenger vehicle traffic

Seasonal variations and incident impacts

2017 Avg

2.17

2.52

1.77

I-495 impacts

Holidays

Longer peak season
Freight Reliability

Historic Data Insights by Year

Severely influenced by I-495 Closure (Jun-Aug 2014)
Target-Setting Perspectives

KEY QUESTIONS:

Is the current set of historical travel time data really indicative of future trends?

What are the anticipated project influences?
- When and where will projects occur?
- What types of improvements will they introduce?
- Will improvements influence speed or travel time (near-, mid-, or long-term)?

What, realistically, might happen to traffic in just two to four years?
- To what degree will anticipated work zone impacts affect target achievement?
- Will this cause more frequent, but not necessarily more severe, “poor” conditions?
- Do short-term expectations degrade, maintain, or improve travel conditions?
Target-Setting Perspectives

Interstate TTR?

- Requires 2-Yr and 4-Yr targets by 5/20/18
- Consider historic declining trends alongside continued growth in overall travel demand?
- Consider notable I-95 work zone impacts?
- Consider short-term declining “threshold” in lieu of “improvement target”, pending anticipated 4-Yr CTP project plans?

<table>
<thead>
<tr>
<th>Interstate TTR Target Considerations</th>
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<tbody>
<tr>
<td>2017 NPMRDS Avg</td>
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<tr>
<td>2017 NPMRDS Range</td>
</tr>
<tr>
<td>Est. Annual Trend</td>
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<tr>
<td>2-Yr Projection</td>
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<tr>
<td>4-Yr Projection</td>
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**TARGET OPTION 1:**
Maintain Current Levels > 80%

**TARGET OPTION 2:**
Manage Current Trends > 75%

**TARGET OPTION 3:**
Expect Work Zone Impacts > 70%
Target-Setting Perspectives

Non-Interstate NHS TTR?

- Requires 4-Yr target only by 5/20/18
- Consider current “acceptable” conditions, with MPO areas at 87 to as high as 98%?
- Consider only marginal declining trends?
- Consider potential project impacts?
- Consider “stabilizing threshold” (in lieu of “target”) to maintain current acceptability?

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TARGET OPTION 1: Maintain Current Levels > 90%
TARGET OPTION 2: Manage Current Trends > 88%
TARGET OPTION 3: Expect Work Zone Impacts > 85%
## Target-Setting Perspectives

### Truck TTR?

- Requires 2-Yr and 4-Yr targets by 5/20/18

- Consider historic degrading trends alongside continued freight growth and development?

- Consider notable I-95 work zone impacts?

- Consider short-term declining “threshold” in lieu of “improvement target” given truck reliance on overall interstate TTR trends?

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**TARGET OPTION 1:** Maintain Current Levels < 2.20  
**TARGET OPTION 2:** Manage Current Trends < 2.50  
**TARGET OPTION 3:** Expect Work Zone Impacts < 2.70
Performance Reporting

Baseline Performance Period Report

Content per Section 490.107(b)(1)(ii)

A. Targets
B. Baseline Condition / Performance
C. Relationship with Other Performance Expectations
D. Urbanized Area Boundaries and Population Data for Targets
E. Congestion at Truck Freight Bottlenecks
F. Nonattainment and Maintenance Area for Targets
G. MPO CMAQ Performance Plan
H. GHG Metrics for the GHG Measure
I. Data Collection Method for the Percent of Non-SOV Travel Measure

DUE 10/1/2018

SUBMITTED!
Mid Performance Period Progress Report

Content per Section 490.107(b)(2)(ii)

A. 2-Year Condition/Performance
B. 2-Year Progress in Achieving Performance Targets
C. Investment Strategy Discussion
D. Congestion at Truck Freight Bottlenecks
E. Target Adjustment Discussion
F. 2-Year Significant Progress Discussion for the NHPP and NHFP Targets
G. Extenuating Circumstances Discussion on 2-Year Targets
H. Applicable Target Achievement Discussion
I. MPO CMAQ Performance Plan
J. GHG Metrics for the GHG Measure
Performance Reporting

Full Performance Period Progress Report

Content per Section 490.107(b)(3)(ii)

A. 4-Year Condition / Performance
B. 4-Year Progress in Achieving Performance Targets
C. Investment Strategy Discussions
D. Congestion at Truck Freight Bottlenecks
E. 4-Year Significant Progress Evaluation for Applicable Targets
F. Extenuating Circumstances Discussion on Applicable Targets
G. Applicable Target Achievement Discussion
H. MPO CMAQ Performance Plan
I. GHG Metrics for the GHG Measure
NPMRDS Data (TTR$_1$ Graph by Year)

Delaware Statewide
TTR$_1$ by Month (2012-2017 Overlay)

More Examples:
Statewide TTR (I), by Year & Month
NPMRDS Data (TTR$_{NI}$ Graph by Year)

More Examples:
Statewide TTR (NI), by Year & Month
NPMRDS Data (TTTR Graph by Year)

More Examples:
Statewide TTTR, by Year & Month

Application:
Transportation Studies