

To: Transportation Committee
Cost Review and Schedule Subcommittee

From: Jennifer Carrier, Director of Transportation Planning
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Date: July 13, 2018 (**Revised 8/24/18: See Changes in Red**)

Subject: Performance Measures and Target Setting – Performance of the National Highway System (NHS)

This memorandum presents and reviews the current performance of the National Highway System (NHS) and associated CTDOT Performance Measure Targets, and offers potential CRCOG recommendations for review and discussion at the July Subcommittee and Transportation Committee meetings. CRCOG has until November 16, 2018 to either adopt CTDOT's targets or set our own.

Performance of the NHS Measures

The **four** performance measures include:

- Percent of person-miles traveled on the Interstate System that are reliable
- Percent of person-miles traveled on the Non-Interstate NHS that are reliable
- Annual hours of peak-hour excessive delay (PHED) per capita (CTDOT will establish in 2022; CRCOG is not required to set this target until 2022 given our region is less than 1 million in population)
- **Percentage of Non-Single Occupancy Vehicle (SOV) Travel (CTDOT will establish in 2022; CRCOG is not required to set this target until 2022 given our region is less than 1 million in population)**

To understand these measures, it is important to have the following background:

- Federal guidance focuses these performance measures on the National Highway System (NHS) which consists of a network of strategic highways, including interstates and other roads that serve major airports, rail or truck terminals, and other strategic transport facilities. The specific NHS roadways within our region are illustrated in Figure 1.
- The Performance of the NHS measures strive to assess travel time reliability. The measurement of travel time reliability is an emerging practice that compares days with high delay to days with average delay. To determine the reliability of a segment, a Level of Travel Time Reliability (LOTTR) is calculated as the ratio of the longer travel times (80th percentile) to a "normal" travel time (50th percentile), with reliability defined as an LOTTR of less than 1.5.
- Predicting future NHS performance in this manner is new, and therefore CTDOT has a low level of confidence in the accuracy of these predictions and targets. CTDOT has obtained newly provided data and software to determine current conditions, however software and/or systems that can predict future performance based on projects or investments are not readily available. CTDOT arrived at the 2-year and 4-year targets by extrapolating future reliability based the very limited number of available historical reliability data-points (less than five data points).
- Penalties may be assessed if reliability targets are not met, however unlike some of the other performance measures, there are no penalties associated with exceeding a minimum percentage of reliability.

National Highway System (NHS) Performance

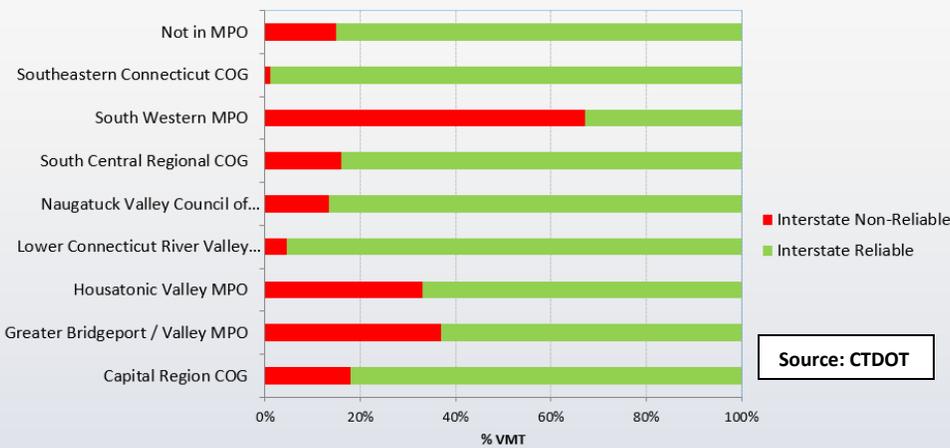
CTDOT's NHS performance targets for the State of Connecticut are illustrated to the right. Of note is that both the 2-year and 4-year targets represent an expected slight decline in travel time reliability on the NHS. These are predicted based on linear extrapolations of limited historical data in various formats, and therefore CTDOT has a low confidence level in their predictive capability.

System Reliability Measures

- % person-miles of Interstate that are "reliable"
- % person-miles of non-Interstate NHS that are "reliable"

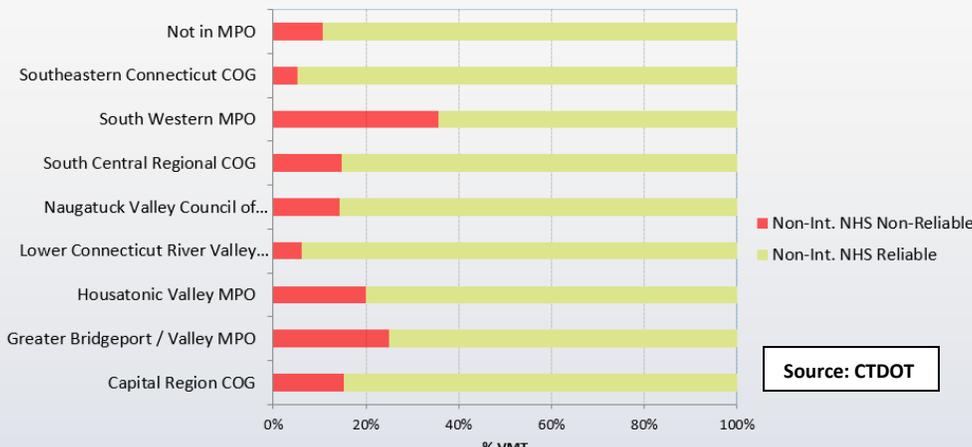
System (unit of measure)	Current Condition	2-year targets (2020)	4-year targets (2022)
	Reliable %	Reliable %	Reliable %
Interstate (person-miles)	78.3	75.2	72.1
Reliability declines in all cases			
Non-Interstate NHS (person-miles)	83.6	80.0	76.4

System Performance Measure (% Reliable), Interstate System Based on Vehicle-Miles Traveled



The graphics to the left illustrate current NHS system reliability within CRCOG as compared to other Connecticut regions. The top graphic shows that CRCOG's Interstates experience reliability of 86.8%, which is more reliable than the 78.3% statewide average. The bottom graphic illustrates that CRCOG's Non-Interstate NHS roadways experience reliability of 84.7%, which is slightly more reliable than the 83.6% statewide average.

System Performance Measure (% Reliable), Non-Int. NHS Based on Vehicle-Miles Traveled



Maps showing locations of the region's reliable and unreliable segments of NHS roadway appear in Figure 2 (for the Interstate System) and Figure 3 (for the Non-Interstate NHS). As shown in Figure 2, the region's unreliable Interstate travel times are mostly contained within the following segments:

- I-84 in West Hartford and Hartford, and portions of I-84 in East Hartford
- Portions of I-91 in Hartford and Wethersfield
- A Portion of I-291 in Windsor and South Windsor

As shown in Figure 3, unreliable segments of the Non-Interstate NHS are distributed throughout CRCOG, with segments contained in most municipalities.

Staff Review of CTDOT's Targets for Performance of the NHS

As mentioned, CTDOT arrived at the 2-year and 4-year targets by extrapolating future reliability based a very limited number of annual historical data-points (less than five). Of note is that these targets represent an expected slight decline in travel time reliability on the NHS statewide. Because the measurement of travel time reliability is an emerging practice, and due to the limited availability of historical data and analysis tools, CTDOT has a low confidence level in the accuracy of these predictions and the resulting targets. Similarly, CRCOG's analysis efforts have focused on determination of existing travel time reliability and have not employed sophisticated future prediction methodologies. Given that the development and use of travel time reliability measures and predictive tools are emerging practices, at this time staff concurs with CTDOT's extrapolation method of target setting.

Staff Recommendations

Given that travel time reliability is an emerging practice, and the lack of tools currently available for predicting targets, CRCOG staff concurs with CTDOT's extrapolation method of targets setting and feels it is premature to employ a separate method on a regional basis. Understanding this, CRCOG staff recommends supporting CTDOT's 2 and 4-year targets for travel time reliability.

However, to further understand and develop this performance measure and associated future target setting, CRCOG staff also recommends that we work on the following initiatives:

- Update CRCOG's Congestion Management Process methodologies to align with travel time reliability performance measure methodologies, and include relevant performance measure/target setting information
- Work towards reviewing and assuring adequate ITS infrastructure is provided in high volume areas (Interstates, etc.) with travel times categorized as unreliable
- Work collaboratively with CTDOT and FHWA to research and implement travel time reliability methodologies and predictive capabilities.
- Incorporate the Travel Time Reliability data and maps into CRCOG's Long Range Transportation Plan
- Monitor Travel Time Reliability best practices in other states and Regional Planning Organizations

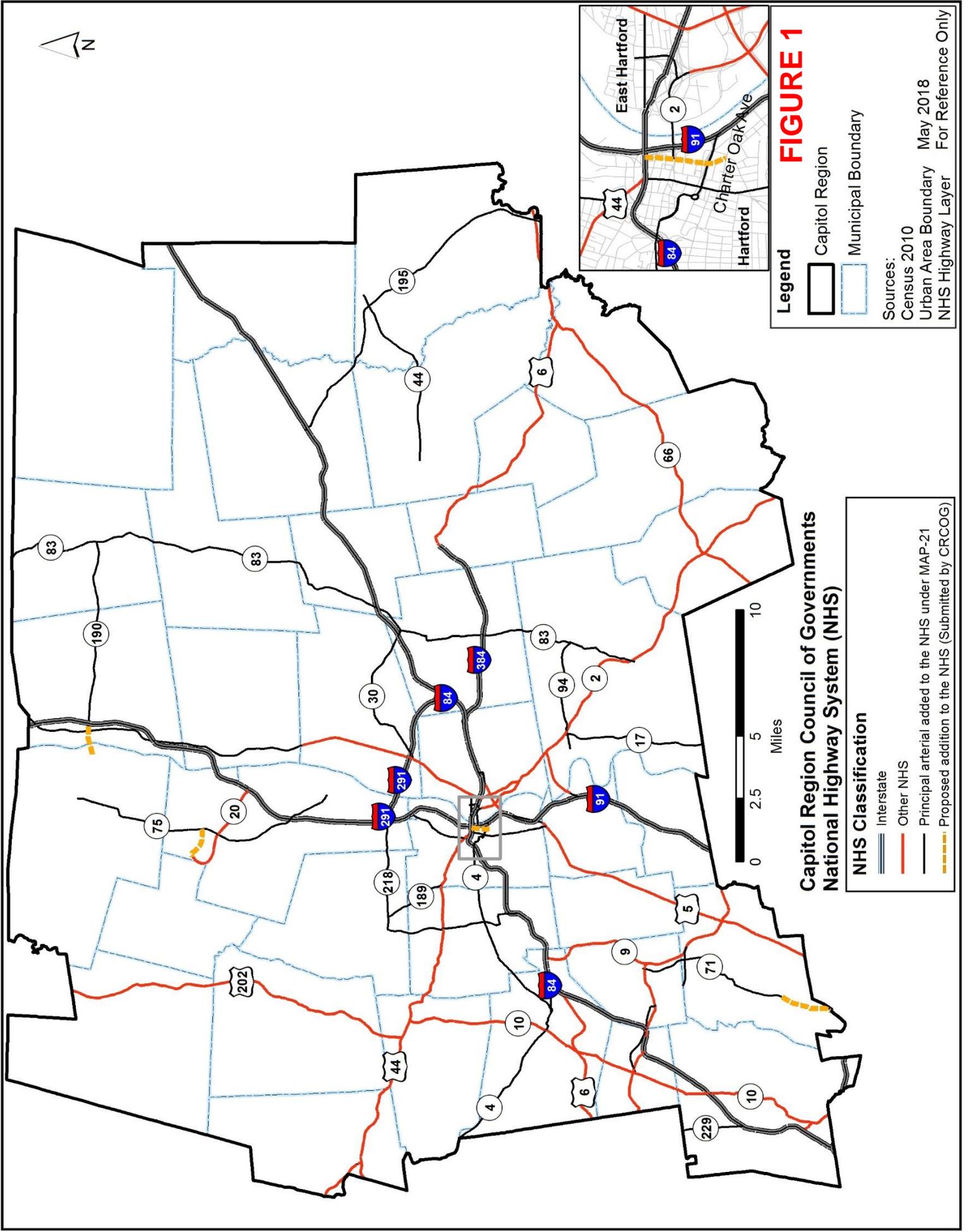


FIGURE 1

Legend

- Capitol Region
- Municipal Boundary

Sources:
 Census 2010
 Urban Area Boundary
 NHS Highway Layer

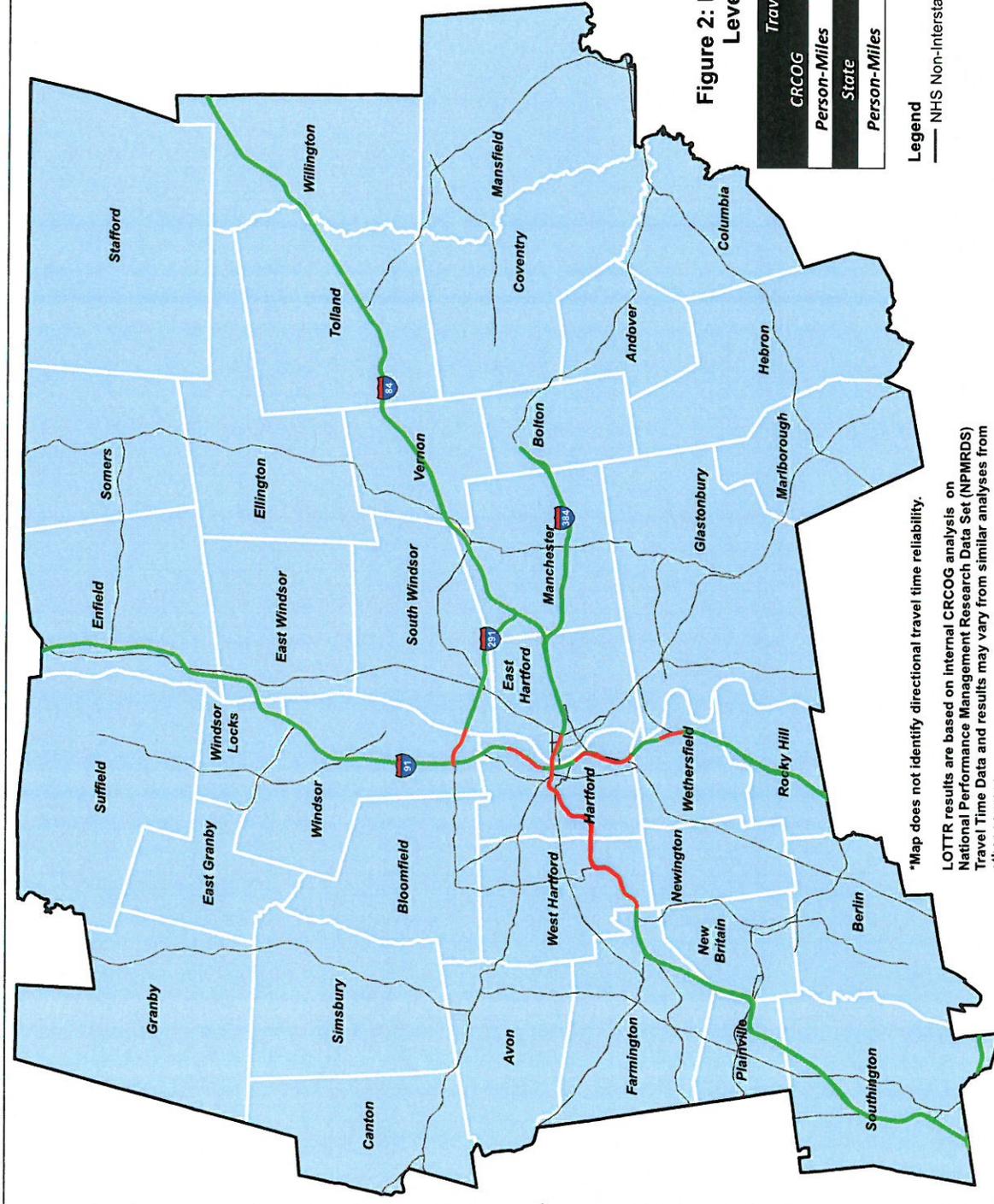
May 2018
 For Reference Only

**Capitol Region Council of Governments
 National Highway System (NHS)**

NHS Classification

- Interstate
- Other NHS
- Principal arterial added to the NHS under MAP-21
- Proposed addition to the NHS (Submitted by CRCOG)





**Figure 2: Interstate National Highway System (NHS)
Level of Travel Time Reliability (LOTR)***

Travel Time Reliability on Interstate Highways			
CRCOG	Reliable	Unreliable	Total
Person-Miles	86.8%	13.2%	100.0%
State	Reliable	Unreliable	Total
Person-Miles	78.3%	21.7%	100.0%

Legend

— NHS Non-Interstate Highways

Level of Travel Time Reliability (LOTR) Threshold

- 1.5 and Below (Reliable)
- Over 1.5 (Unreliable)



*Map does not identify directional travel time reliability.

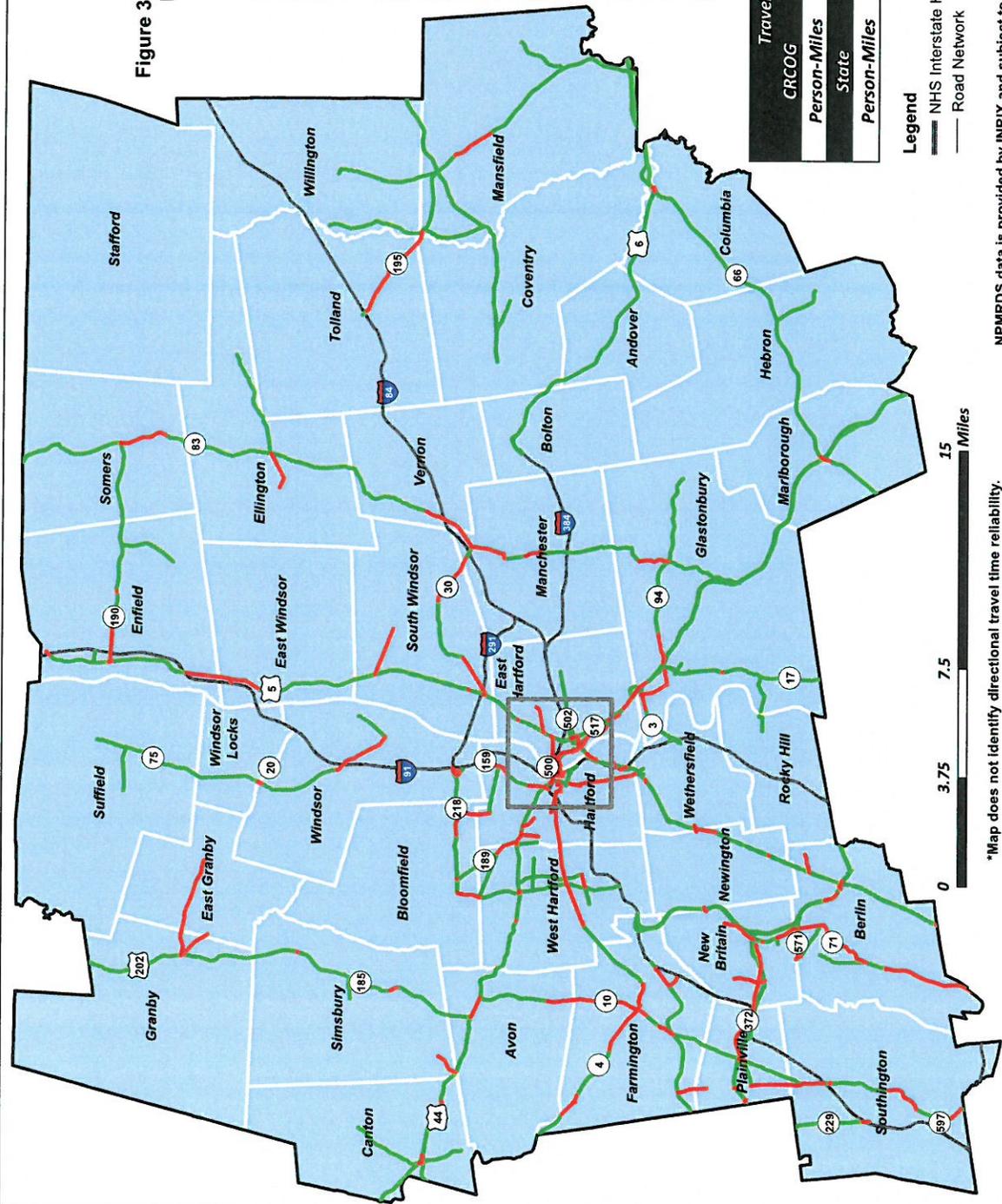
LOTR results are based on internal CRCOG analysis on National Performance Management Research Data Set (NPMRDS) Travel Time Data and results may vary from similar analyses from other sources.

NPMRDS data is provided by INRIX and subject to frequent updates. Gaps in the INRIX data exist and results may change as updates and refinements (eg. HOV Lanes) are made.

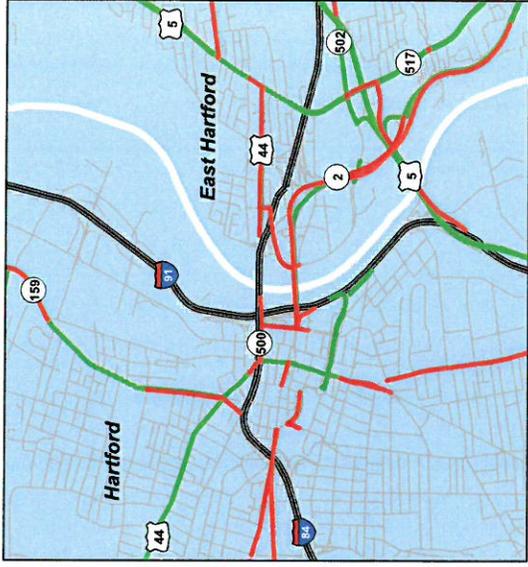
Date: July 2018
 Datasource: 2017 NPMRDS Travel Time Data
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**Figure 3: Non-Interstate National Highway System (NHS)
Level of Travel Time Reliability (LOTRR)***



Inset Map



Travel Time Reliability on Non-Interstate Highways			
CRCOG	Reliable	Unreliable	Total
Person-Miles	84.7%	15.3%	100.0%
State	Reliable	Unreliable	Total
Person-Miles	83.6%	16.4%	100.0%

Legend

- NHS Interstate Highways
- Road Network

Level of Travel Time Reliability (LOTRR) Threshold

- 1.5 and Below (Reliable)
- Over 1.5 (Unreliable)

NPMRDS data is provided by INRIX and subject to frequent updates. Gaps in the INRIX data exist and results may change as updates and refinements (eg. HOV Lanes) are made.

Additional non-interstate roadway segments with NPMRDS travel time data has been added to the map for informational purposes.

Date: July 2018
 Datasource: 2017 NPMRDS Travel Time Data
 For Reference Purposes Only.



*Map does not identify directional travel time reliability.

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