System Reliability & Freight Targets

2026-2029 Performance Period

September 30, 2026

Introduction

Through the Moving Ahead for Progress in the 21st Century (MAP-21) Act, Congress required the establishment of measures to assess performance in several areas, including performance of the Interstate and non-Interstate National Highway System (NHS), codified in 23 CFR 490.507, and freight movement on the Interstate System, codified in 23 CFR 490.607. State Departments of Transportation (DOTs), as well as Metropolitan Planning Organizations (MPOs) with applicable roadways within their metropolitan planning areas, set targets for the following performance measures, known as "PM3."

1. Percent of person-miles traveled on the Interstate that are reliable
2. Percent of person-miles traveled on the non-Interstate NHS that are reliable
3. Truck Travel Time Reliability Index (Interstate only)

Targets are set for all roadways on the applicable system within a state or MPO, regardless of ownership. Target setting occurs for 4-year periods, with the first targets established in 2018 for the performance period of calendar years (CY) 2018-2021. States must now set 2- and 4-year targets for the third performance period of CY 2026-2029. Once states establish targets, MPOs will have 180 days to either support the state's 4-year targets or set their own.

Data Collection and Analysis

Data for these measures is provided by the Federal Highway Administration (FHWA) through the National Performance Management Research Data Set (NPMRDS). This is a national data set of average travel times on the NHS. Since February 2017, speed and travel time data from INRIX has been used for the NPMRDS, which is hosted by the University of Maryland Center for Advanced Transportation Technology Laboratory (CATT Lab). States and MPOs can access raw data at no cost. The CATT Lab has also developed a MAP-21 tool to assist states and MPOs in calculating PM3 measures. This tool is available through a technical services program (TSP) administered by the American Association of State Highway and Transportation Officials (AASHTO). Iowa DOT is currently participating in the TSP; this participation also provides Iowa's MPOs access to the MAP-21 tool and output.

State DOTs must establish 2- and 4-year targets for the percent of reliable person-miles on the Interstate System and the non-Interstate NHS. The level of travel time reliability (LOTTR) is the metric for determining the performance measures. The following steps are used to calculate the LOTTR.

1. Data for all vehicle traffic is analyzed based on 15-minute bins of speeds and travel times for traffic message channels (TMCs), which are highway segments that NPMRDS data are reported for. These 15-minute bins are grouped by four time periods for the entire calendar year.
    - Weekdays from 6:00 a.m. – 10:00 a.m.
    - Weekdays from 10:00 a.m. – 4:00 p.m.
    - Weekdays from 4:00 p.m. – 8:00 p.m.
    - Weekends from 6:00 a.m. – 8:00 p.m.

2. For each of the four time periods, the TMC's LOTTR is defined as the ratio of the longer travel time (80th percentile of 15-minute bins) to a "normal" travel time (50th percentile of 15-minute bins) for all vehicles. FHWA defines a segment as reliable if its LOTTR is less than 1.50 during all four time periods. If the maximum LOTTR from the four time periods is 1.50 or higher, the segment is considered unreliable.
3. To translate the LOTTR to the performance measure, the length of each segment is multiplied by its annual average daily traffic (AADT) and average occupancy factor for all vehicles (FHWA's default is 1.7), which results in person-miles.
4. This calculation is done for reliable segments and for all segments. Dividing the sum of reliable segment person-miles by the sum of all segment person-miles provides the measure of percent of reliable person-miles.

State DOTs must also establish 2- and 4-year targets for truck travel time reliability (TTTR) on the Interstate System. This measure is calculated similarly to the LOTTR-based measures, but the metric's parameters are slightly different, and it is not translated into a percentage of reliable person-miles. This measure also uses a subset of the NPMRDS data that contains only truck data, rather than all-vehicle data. The TTTR index is the metric for determining the performance measure. The following steps are used to calculate the TTTR index.

1. Data for truck traffic is analyzed based on 15-minute bins of speeds and travel times for traffic message channels (TMCs), which are highway segments that NPMRDS data are reported for. These 15-minute bins are grouped by five time periods for the entire calendar year.
    - Weekdays from 6:00 a.m. – 10:00 a.m.
    - Weekdays from 10:00 a.m. – 4:00 p.m.
    - Weekdays from 4:00 p.m. – 8:00 p.m.
    - Overnight (all days) from 8:00 p.m. – 6:00 a.m.
    - Weekends from 6:00 a.m. – 8:00 p.m.
2. For each of the five time periods, the TMC's TTTR is defined as the ratio of the longer travel time (95th percentile of 15-minute bins) to a "normal" travel time (50th percentile of 15-minute bins) for trucks. For each TMC, the highest TTTR value from the five time periods is carried forward into the measure calculation.
3. To translate the individual TMC values into the overall TTTR index, the length of each segment is multiplied by its maximum TTTR from the five time periods.
4. These length-weighted TTTRs are then added together and divided by the sum of all segment lengths to result in the TTTR index for the performance measure. A lower TTTR index indicates a higher amount of system reliability per the performance measure, with 1.0 being the lowest possible value.

The CATT Lab tool provides output necessary for Iowa DOT's annually required data submission to the Highway Performance Monitoring System (HPMS), including the LOTTR and TTTR metrics for each TMC for each time period. The tool also provides the overall LOTTR and TTTR for states and MPOs on an annual and monthly basis. The monthly output helps show seasonal patterns in reliability. There is a wide range of variability between the monthly and annual data because in each case the percentiles are calculated based on the travel times solely within the timeframe being evaluated. The annual measurements

typically show higher reliability than the monthly measurements, illustrated in Figures 1 and 2. Full data for these figures is available in the Appendix.

Figure 1: Historical annual and monthly Interstate and non-Interstate NHS Level of Travel Time Reliability (LOTTR)

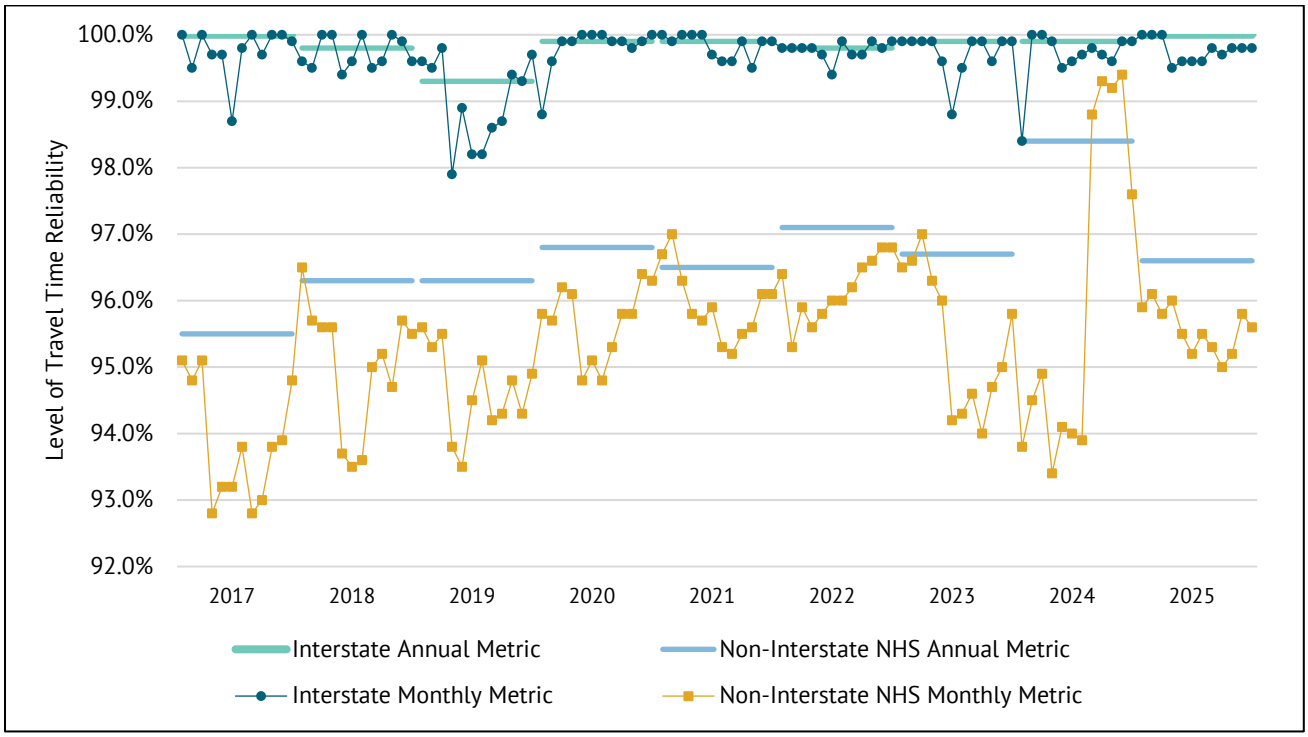
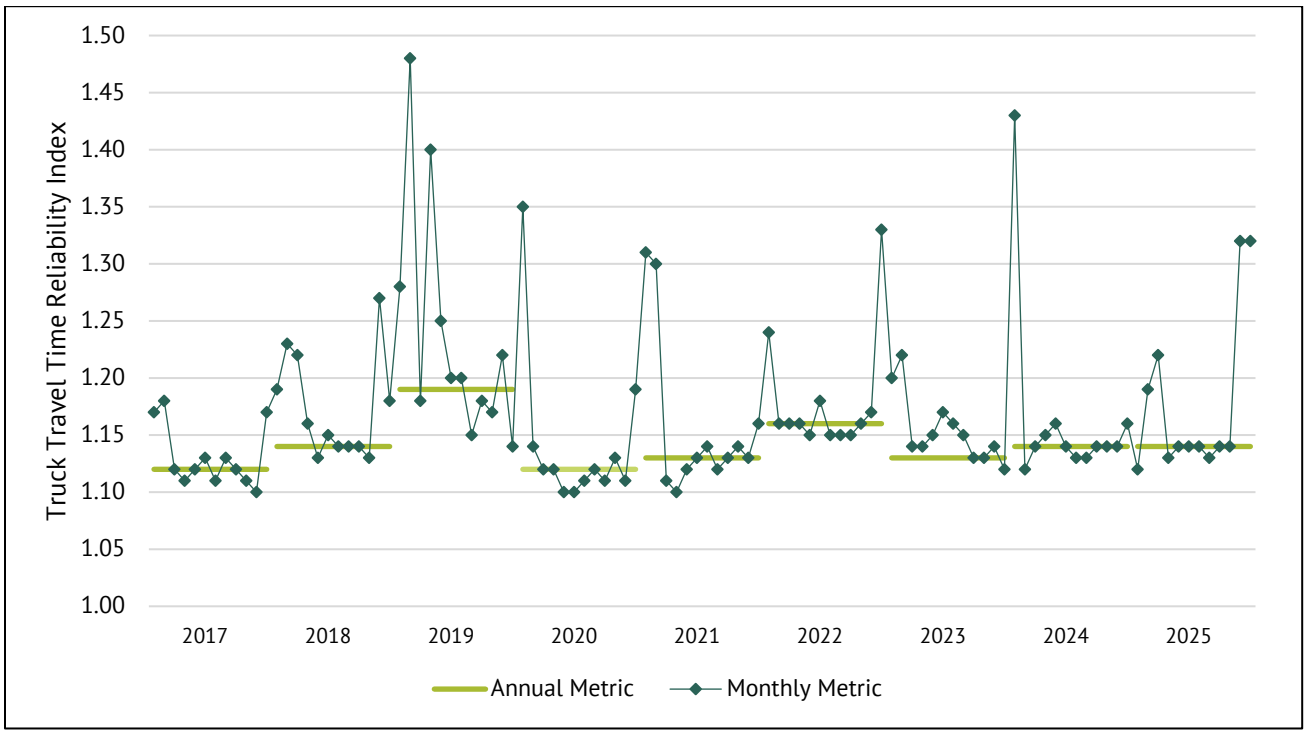


Figure 2: Historical annual and monthly Interstate Truck Travel Time Reliability (TTTR) Index

(lower TTTR = higher reliability)



Target Setting Methodology

To develop targets, annual performance from 2017-2025 was reviewed. This showed that Iowa consistently has extremely high annual reliability per these measures, but there are minor variations from year to year. Review of unreliable or poorly performing TMCs showed the following patterns.

- Unreliable Interstate TMCs were typically associated with work zones or high-volume commuter corridors.
- Unreliable non-Interstate NHS TMCs were often associated with work zones or located in urban areas (over 5,000 population), which have more corridors with slower speeds, commuter traffic, traffic control devices, and other urban characteristics that can impede traffic.
- Interstate TTTR data has been very consistent year to year. The most significant impact was seen in 2019 during extreme flooding in western Iowa, which resulted in repeated closures of I-29 for weeks or months in some locations.

A review of Iowa's performance relative to other states showed that Iowa was consistently in the top five states for all three measures across 2017-2025 and ranked #1 for all three measures in 2025. Iowa DOT desires to maintain this high level of reliability. The same targets from the prior performance period are being used for 2026-2029. Targets are set in a manner that is conservative relative to past performance, but that still represent extremely high system reliability. This will allow for fluctuations in reliability due to issues like major work zones and unanticipated events such as closures due to extreme weather or natural disasters.

Figure 3 shows the historical performance, prior targets, and 2026-2029 targets for travel time reliability for both the Interstate System and the non-Interstate NHS. Figure 4 shows the historical performance, prior targets, and 2026-2029 targets for the Truck Travel Time Reliability Index for the Interstate System. Table 1 summarizes Iowa DOT's PM3 targets. The 2- and 4-year targets were held constant, though the 4-year targets will be reviewed at the midpoint of the performance period and adjusted if appropriate.

Figure 3: Interstate and non-Interstate NHS historical LOTTR, prior targets, and 2026-2029 targets

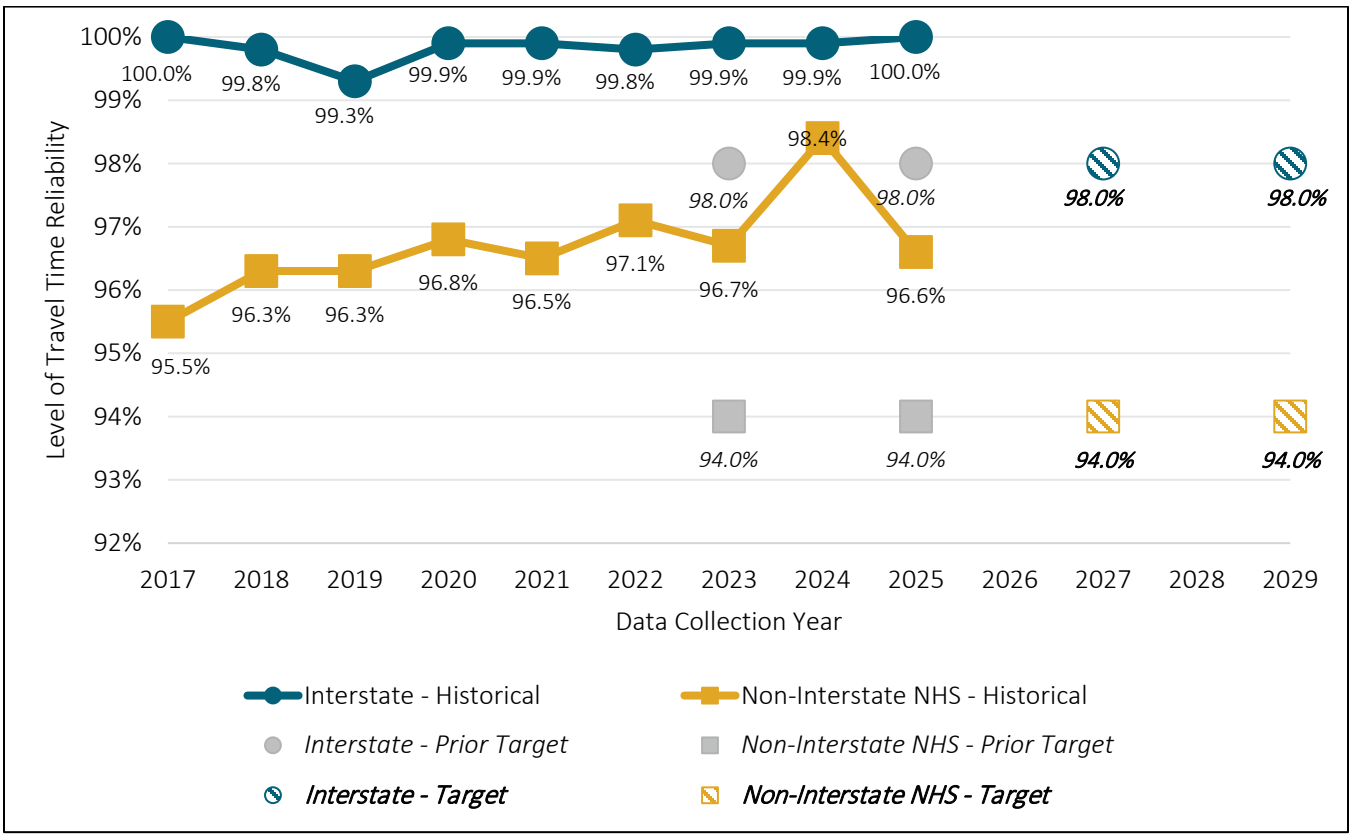


Figure 4: Interstate historical TTTR index, prior targets, and 2026-2029 targets

(lower TTTR index = higher reliability)

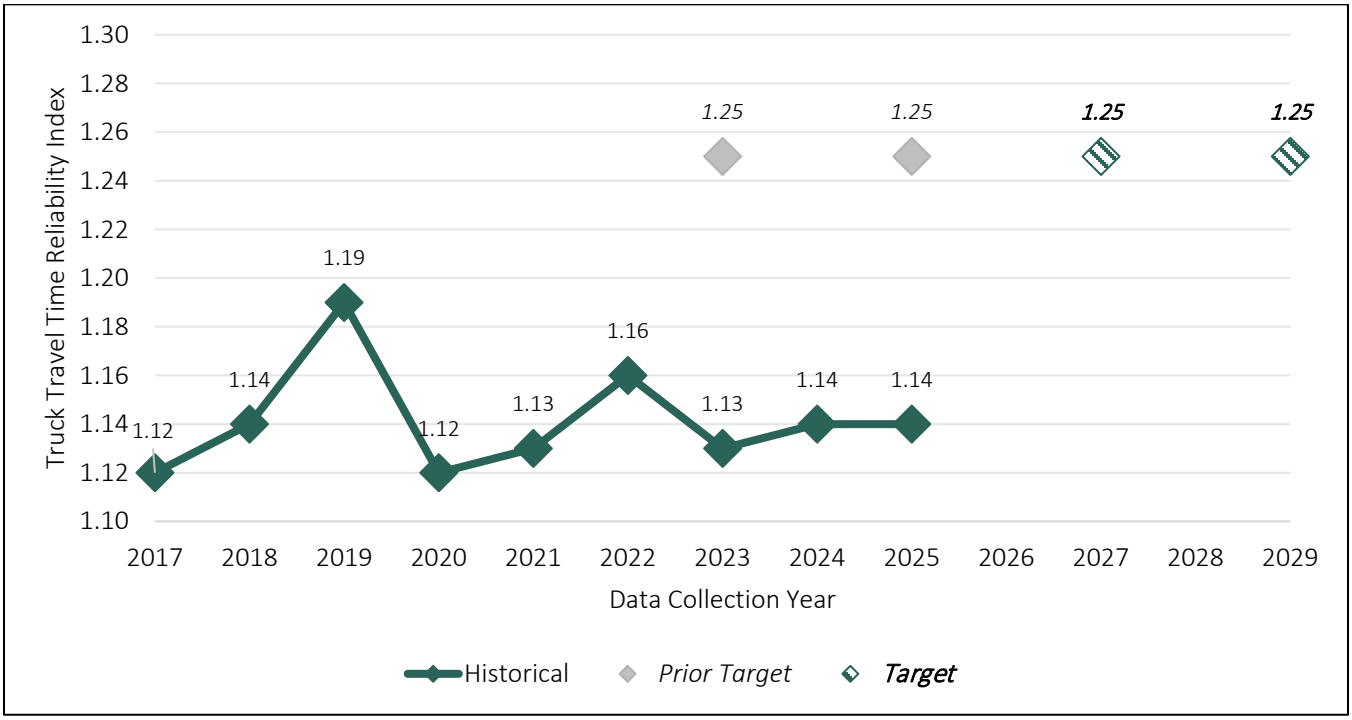


Table 1: Iowa DOT PM3 targets for 2026-2029

Performance Measure	Baseline (CY 2025)	2-year Target (CY 2027)	4-year Target (CY 2029)
Percent of person-miles traveled on the Interstate that are reliable	100.0%	98.0%	98.0%
Percent of person-miles traveled on the non-Interstate NHS that are reliable	96.6%	94.0%	94.0%
Truck Travel Time Reliability Index (Interstate only)	1.14	1.25	1.25

Note: the years represent the calendar year in which data was collected. Data is reported through the Highway Performance Monitoring System (HPMS) the following year. For example, the baseline data of CY 2025 was reported to the HPMS in CY 2026.

It is important to note that these targets are based on FHWA definitions of reliability, which have been nationally defined to achieve a standard measurement across states. These metrics and definitions of reliability may not be the same as other reliability metrics the Iowa DOT uses to evaluate system performance and may not be the best indicator of what a typical traveler considers to be a reliable transportation system. Overall, these metrics show that Iowa has a very reliable Interstate System and non-Interstate National Highway System.

Appendix: Data for Figures 1 and 2

Year	Month	Interstate LOTTR Monthly Metric	Interstate LOTTR Annual Metric	Non-Interstate NHS LOTTR Monthly Metric	Non-Interstate NHS LOTTR Annual Metric	Interstate TTTR Monthly Metric	Interstate TTTR Annual Metric
2017	January	100.0%	100.0%	95.1%	95.5%	1.17	1.12
	February	99.5%	100.0%	94.8%	95.5%	1.18	1.12
	March	100.0%	100.0%	95.1%	95.5%	1.12	1.12
	April	99.7%	100.0%	92.8%	95.5%	1.11	1.12
	May	99.7%	100.0%	93.2%	95.5%	1.12	1.12
	June	98.7%	100.0%	93.2%	95.5%	1.13	1.12
	July	99.8%	100.0%	93.8%	95.5%	1.11	1.12
	August	100.0%	100.0%	92.8%	95.5%	1.13	1.12
	September	99.7%	100.0%	93.0%	95.5%	1.12	1.12
	October	100.0%	100.0%	93.8%	95.5%	1.11	1.12
	November	100.0%	100.0%	93.9%	95.5%	1.10	1.12
	December	99.9%	100.0%	94.8%	95.5%	1.17	1.12
2018	January	99.6%	99.8%	96.5%	96.3%	1.19	1.14
	February	99.5%	99.8%	95.7%	96.3%	1.23	1.14
	March	100.0%	99.8%	95.6%	96.3%	1.22	1.14
	April	100.0%	99.8%	95.6%	96.3%	1.16	1.14
	May	99.4%	99.8%	93.7%	96.3%	1.13	1.14
	June	99.6%	99.8%	93.5%	96.3%	1.15	1.14
	July	100.0%	99.8%	93.6%	96.3%	1.14	1.14
	August	99.5%	99.8%	95.0%	96.3%	1.14	1.14
	September	99.6%	99.8%	95.2%	96.3%	1.14	1.14
	October	100.0%	99.8%	94.7%	96.3%	1.13	1.14
	November	99.9%	99.8%	95.7%	96.3%	1.27	1.14
	December	99.6%	99.8%	95.5%	96.3%	1.18	1.14
2019	January	99.6%	99.3%	95.6%	96.3%	1.28	1.19
	February	99.5%	99.3%	95.3%	96.3%	1.48	1.19
	March	99.8%	99.3%	95.5%	96.3%	1.18	1.19
	April	97.9%	99.3%	93.8%	96.3%	1.40	1.19
	May	98.9%	99.3%	93.5%	96.3%	1.25	1.19
	June	98.2%	99.3%	94.5%	96.3%	1.20	1.19
	July	98.2%	99.3%	95.1%	96.3%	1.20	1.19
	August	98.6%	99.3%	94.2%	96.3%	1.15	1.19
	September	98.7%	99.3%	94.3%	96.3%	1.18	1.19
	October	99.4%	99.3%	94.8%	96.3%	1.17	1.19
	November	99.3%	99.3%	94.3%	96.3%	1.22	1.19
	December	99.7%	99.3%	94.9%	96.3%	1.14	1.19

Year	Month	Interstate LOTTR Monthly Metric	Interstate LOTTR Annual Metric	Non-Interstate NHS LOTTR Monthly Metric	Non-Interstate NHS LOTTR Annual Metric	Interstate TTTR Monthly Metric	Interstate TTTR Annual Metric
2020	January	98.8%	99.9%	95.8%	96.8%	1.35	1.12
	February	99.6%	99.9%	95.7%	96.8%	1.14	1.12
	March	99.9%	99.9%	96.2%	96.8%	1.12	1.12
	April	99.9%	99.9%	96.1%	96.8%	1.12	1.12
	May	100.0%	99.9%	94.8%	96.8%	1.10	1.12
	June	100.0%	99.9%	95.1%	96.8%	1.10	1.12
	July	100.0%	99.9%	94.8%	96.8%	1.11	1.12
	August	99.9%	99.9%	95.3%	96.8%	1.12	1.12
	September	99.9%	99.9%	95.8%	96.8%	1.11	1.12
	October	99.8%	99.9%	95.8%	96.8%	1.13	1.12
	November	99.9%	99.9%	96.4%	96.8%	1.11	1.12
	December	100.0%	99.9%	96.3%	96.8%	1.19	1.12
2021	January	100.0%	99.9%	96.7%	96.5%	1.31	1.13
	February	99.9%	99.9%	97.0%	96.5%	1.30	1.13
	March	100.0%	99.9%	96.3%	96.5%	1.11	1.13
	April	100.0%	99.9%	95.8%	96.5%	1.10	1.13
	May	100.0%	99.9%	95.7%	96.5%	1.12	1.13
	June	99.7%	99.9%	95.9%	96.5%	1.13	1.13
	July	99.6%	99.9%	95.3%	96.5%	1.14	1.13
	August	99.6%	99.9%	95.2%	96.5%	1.12	1.13
	September	99.9%	99.9%	95.5%	96.5%	1.13	1.13
	October	99.5%	99.9%	95.6%	96.5%	1.14	1.13
	November	99.9%	99.9%	96.1%	96.5%	1.13	1.13
	December	99.9%	99.9%	96.1%	96.5%	1.16	1.13
2022	January	99.8%	99.8%	96.4%	97.1%	1.24	1.16
	February	99.8%	99.8%	95.3%	97.1%	1.16	1.16
	March	99.8%	99.8%	95.9%	97.1%	1.16	1.16
	April	99.8%	99.8%	95.6%	97.1%	1.16	1.16
	May	99.7%	99.8%	95.8%	97.1%	1.15	1.16
	June	99.4%	99.8%	96.0%	97.1%	1.18	1.16
	July	99.9%	99.8%	96.0%	97.1%	1.15	1.16
	August	99.7%	99.8%	96.2%	97.1%	1.15	1.16
	September	99.7%	99.8%	96.5%	97.1%	1.15	1.16
	October	99.9%	99.8%	96.6%	97.1%	1.16	1.16
	November	99.8%	99.8%	96.8%	97.1%	1.17	1.16
	December	99.9%	99.8%	96.8%	97.1%	1.33	1.16

Year	Month	Interstate LOTTR Monthly Metric	Interstate LOTTR Annual Metric	Non-Interstate NHS LOTTR Monthly Metric	Non-Interstate NHS LOTTR Annual Metric	Interstate TTTR Monthly Metric	Interstate TTTR Annual Metric
2023	January	99.9%	99.9%	96.5%	96.7%	1.20	1.13
	February	99.9%	99.9%	96.6%	96.7%	1.22	1.13
	March	99.9%	99.9%	97.0%	96.7%	1.14	1.13
	April	99.9%	99.9%	96.3%	96.7%	1.14	1.13
	May	99.6%	99.9%	96.0%	96.7%	1.15	1.13
	June	98.8%	99.9%	94.2%	96.7%	1.17	1.13
	July	99.5%	99.9%	94.3%	96.7%	1.16	1.13
	August	99.9%	99.9%	94.6%	96.7%	1.15	1.13
	September	99.9%	99.9%	94.0%	96.7%	1.13	1.13
	October	99.6%	99.9%	94.7%	96.7%	1.13	1.13
	November	99.9%	99.9%	95.0%	96.7%	1.14	1.13
	December	99.9%	99.9%	95.8%	96.7%	1.12	1.13
2024	January	98.4%	99.9%	93.8%	98.4%	1.43	1.14
	February	100.0%	99.9%	94.5%	98.4%	1.12	1.14
	March	100.0%	99.9%	94.9%	98.4%	1.14	1.14
	April	99.9%	99.9%	93.4%	98.4%	1.15	1.14
	May	99.5%	99.9%	94.1%	98.4%	1.16	1.14
	June	99.6%	99.9%	94.0%	98.4%	1.14	1.14
	July	99.7%	99.9%	93.9%	98.4%	1.13	1.14
	August	99.8%	99.9%	98.8%	98.4%	1.13	1.14
	September	99.7%	99.9%	99.3%	98.4%	1.14	1.14
	October	99.6%	99.9%	99.2%	98.4%	1.14	1.14
	November	99.9%	99.9%	99.4%	98.4%	1.14	1.14
	December	99.9%	99.9%	97.6%	98.4%	1.16	1.14
2025	January	100.0%	100.0%	95.9%	96.6%	1.12	1.14
	February	100.0%	100.0%	96.1%	96.6%	1.19	1.14
	March	100.0%	100.0%	95.8%	96.6%	1.22	1.14
	April	99.5%	100.0%	96.0%	96.6%	1.13	1.14
	May	99.6%	100.0%	95.5%	96.6%	1.14	1.14
	June	99.6%	100.0%	95.2%	96.6%	1.14	1.14
	July	99.6%	100.0%	95.5%	96.6%	1.14	1.14
	August	99.8%	100.0%	95.3%	96.6%	1.13	1.14
	September	99.7%	100.0%	95.0%	96.6%	1.14	1.14
	October	99.8%	100.0%	95.2%	96.6%	1.14	1.14
	November	99.8%	100.0%	95.8%	96.6%	1.32	1.14
	December	99.8%	100.0%	95.6%	96.6%	1.32	1.14