

§ 490.411 Establishment of minimum level for condition for bridges.

(a) State DOTs will maintain bridges so that the percentage of the deck area of bridges classified as Structurally Deficient does not exceed 10.0 percent. This minimum condition level is applicable to bridges carrying the NHS, which includes on- and off-ramps connected to the NHS within a State, and bridges carrying the NHS that cross a State border.

(b) For the purposes of carrying out this section and § 490.413, a bridge will

be classified as Structurally Deficient when one of its NBI Items, 58—Deck, 59—Superstructure, 60—Substructure, or 62—Culverts, is 4 or less, or when one of its NBI Items, 67—Structural Evaluation or 71—Waterway Adequacy, is 2 or less. Beginning with calendar year 2018 and thereafter, a bridge will be classified as Structurally Deficient when one of its NBI Items, 58—Deck, 59—Superstructure, 60—Substructure, or 62—Culverts, is 4 or less.

(c) For all bridges carrying the NHS, which includes on- and off-ramps connected to the NHS and bridges carrying the NHS that cross a State border, FHWA shall calculate a ratio of the total deck area of all bridges classified as Structurally Deficient to the total deck area of all applicable bridges for each State. The percentage of deck area of bridges classified as Structurally Deficient shall be computed by FHWA to the one tenth of a percent as follows:

$$100 \times \frac{\sum_{SD=1}^{\text{Structurally Deficient}} [\text{Length} \times \text{Width}]_{\text{Bridge SD}}}{\sum_{s=1}^{\text{TOTAL}} [\text{Length} \times \text{Width}]_{\text{Bridge s}}}$$

Where:

Structurally Deficient = total number of the applicable bridges, where their classification is Structurally Deficient per this section and § 490.413;

SD = a bridge classified as Structurally Deficient per this section and § 490.413;

Length = corresponding value of NBI Item 49—Structure Length for every applicable bridge;

Width = corresponding value of NBI Item 52—Deck Width

Beginning with calendar year 2018 and thereafter, Width = corresponding value of NBI Item 52—Deck Width or value of Item 32 Approach Roadway Width for culverts where the roadway is on a fill [i.e., traffic does not directly run on the top slab (or wearing surface) of the culvert] and the headwalls do not affect the flow of traffic for every applicable bridge.

s = an applicable bridge per this section and § 490.413; and

TOTAL = total number of the applicable bridges specified in this section and § 490.413.

(d) The FHWA will annually determine the percentage of the deck area of NHS bridges classified as Structurally Deficient for each State DOT and identify State DOTs that do not meet the minimum level of condition for NHS bridges based on data cleared in the NBI as of June 15 of each year. The FHWA will notify State DOTs of their compliance with 23 U.S.C. 119(f)(2) prior to October 1 of the year in which the determination was made.

(e) For the purposes of carrying out this section, State DOTs will annually submit their most current NBI data on highway bridges to FHWA no later than March 15 of each year.

(f) The NBI Items included in this section are found in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, which is incorporated by reference (see § 490.111).

§ 490.413 Penalties for not maintaining bridge condition.

(a) If FHWA determines for the 3-year period preceding the date of the determination, that more than 10.0 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient, the following requirements will apply.

(1) During the fiscal year following the determination, the State DOT shall obligate and set aside in an amount equal to 50 percent of funds apportioned to such State for fiscal year 2009 to carry out 23 U.S.C. 144 (as in effect the day before enactment of MAP-21) from amounts apportioned to a State for a fiscal year under 23 U.S.C. 104(b)(1) only for eligible projects on bridges on the NHS.

(2) The set-aside and obligation requirement for bridges on the NHS in a State in paragraph (a) of this section for a fiscal year shall remain in effect for each subsequent fiscal year until such time as less than 10 percent of the total deck area of bridges in the State on the NHS is located on bridges that have been classified as Structurally Deficient as determined by FHWA.

(b) The FHWA will make the first determination by October 1, 2016, and each fiscal year thereafter.

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DEPARTMENT OF TRANSPORTATION**Federal Highway Administration****23 CFR Part 490**

[Docket No. FHWA-2013-0054]

RIN 2125-AF54

National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program

AGENCY: Federal Highway Administration (FHWA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: This final rule is the third and last in a series of three related rulemakings that together establishes a set of performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act. The measures in this third final rule will be used by State DOTs and MPOs to assess the performance of the Interstate and non-Interstate National Highway System (NHS) for the purpose of carrying out the National Highway Performance Program (NHPP); to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. This third performance measure final rule also includes a discussion that summarizes all three of the national performance management measures

rules and the comprehensive regulatory impact analysis (RIA) to include all three final rules.

DATES: This final rule is February 17, 2017.

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SUPPLEMENTARY INFORMATION:

Electronic Access and Filing

The notice of proposed rulemaking (NPRM) was published at 81 FR 23806 on April 22, 2016. A copy of the NPRM, all comments received, and all background material may be viewed online at <http://www.regulations.gov>. Electronic retrieval help and guidelines are available on the Web site. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register's Web site at <http://www.ofr.gov> and the Government Publishing Office's Web site at <http://www.gpo.gov>.

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I. Executive Summary

A. Purpose of the Regulatory Action

The MAP-21 (Pub. L. 112-141) transforms the Federal-aid highway program by establishing new requirements for performance management to ensure the most efficient investment of Federal transportation funds. Performance management increases the accountability and transparency of the Federal-aid highway program and provides a framework to

support improved investment decisionmaking through a focus on performance outcomes for key national transportation goals.

As part of performance management, recipients of Federal-aid highway funds will make transportation investments to achieve performance targets that make progress toward the following national goals:

- Safety—To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- Infrastructure condition—To maintain the highway infrastructure asset system in a state of good repair.
- Congestion reduction—To achieve a significant reduction in congestion on the NHS.
- System reliability—To improve the efficiency of the surface transportation system.
- Freight movement and economic vitality—To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

- Environmental sustainability—To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- Reduced project delivery delays—To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

The purpose of this final rule is to implement MAP-21 and FAST Act (PL 114-94) performance management requirements. Prior to MAP-21, there were no explicit requirements for State DOTs to demonstrate how their transportation program supported national performance outcomes. State DOTs were not required to measure condition or performance, establish targets, assess progress toward targets, or report on condition or performance in a nationally consistent manner that FHWA could use to assess the entire system. Without States reporting on the above factors, it is difficult for FHWA to examine the effectiveness of the Federal-aid highway program as a means to address surface transportation performance at a national level.

This final rule is one of several rulemakings to implement MAP-21's new performance management framework. The collective rulemakings will establish the regulations needed to more effectively evaluate and report on surface transportation performance across the Nation. This final rule will:

- Provide for greater consistency in the reporting of condition and performance;
- Establish specific national performance measures to be used to assess performance of the NHS, freight movement on the Interstate and CMAQ traffic congestion and on-road mobile source emissions;
- Require the establishment of targets that can be aggregated at the national level;
- Improve transparency by requiring consistent reporting on progress through a public reporting system;
- Require State DOTs to make significant progress toward meeting their targets; and
- Establish requirements for State DOTs that have not met or made significant progress toward achieving their NHPP and NHFP targets.

State DOTs and MPOs will be expected to use the information and data generated as a result of the new regulations to inform their transportation planning and programming decisions. The new performance aspects of the Federal-aid highway program that result from this rule will provide FHWA the ability to better communicate a national performance story and to assess the impacts of Federal funding investments more reliably. The FHWA is in the process of creating a new public Web site to help communicate the national performance story and display State DOT performance reports. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that State DOTs will be reporting to FHWA.

The FHWA is required to establish performance measures to assess performance in 12 areas¹ generalized as follows: (1) Serious injuries per vehicle miles traveled (VMT); (2) fatalities per VMT; (3) number of serious injuries; (4) number of fatalities; (5) pavement condition on the Interstate System; (6) pavement condition on the non-Interstate NHS; (7) bridge condition on the NHS; (8) performance of the Interstate System; (9) performance of the non-Interstate NHS; (10) freight movement on the Interstate System; (11) traffic congestion; and (12) on-road mobile source emissions. This rulemaking is the third of three that establish performance measures for State DOTs and MPOs to use to carry out Federal-aid highway programs and to assess performance in each of these 12 areas. This final rule establishes

¹ These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

national performance measures for the NHPP, freight movement, and the CMAQ program (numbers 8 through 12 in the above list). See Table 1 for a summary of all measures.

The final measures in this rule have been adjusted in response to comments, and those changes are summarized in Section I.B of the Executive Summary. Details about data requirements and calculation methodologies for each measure can be found in Section VI.

Three measures are established for assessing the performance of the NHS under the NHPP. Two measures assess reliability: (1) Percent of Person-Miles Traveled on the Interstate System That Are Reliable (the Interstate Travel Time Reliability measure); and (2) Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure). Together they are the Travel Time Reliability measures. Both of these measures assess Level of Travel Time Reliability (LOTTR), defined as the ratio of the 80th percentile travel time to a "normal" travel time (50th percentile). Data are derived from the travel time data set using either the National Performance Management Research Data Set (NPMRDS) or equivalent. A third measure, Percent Change in Tailpipe CO₂ Emissions on the NHS from the Calendar Year 2017, assesses environmental performance. This measure is calculated using data on fuel use and VMT.

The performance measure to assess freight movement on the Interstate is Percentage of the Interstate System Mileage providing for Reliable Truck Travel Times, or Truck Travel Time Reliability (TTTR) Index (the Freight Reliability measure). The measure also uses the Travel Time Data Set of NPRMDS, but unlike the LOTTR which uses a threshold to determine reliability, TTTR Index is expressed as an average for the entire applicable area.

Three measures are established under the CMAQ program (the CMAQ measures) including two measures for traffic congestion: (1) Annual Hours of Peak-Hour Excessive Delay Per Capita (the PHED measure); and (2) Percent of Non-SOV Travel where SOV stands for single-occupancy vehicle. Data for these two measures are derived from the travel time data set of NPMRDS. The second measure is a new measure developed to recognize the role of lower-emissions modes in meeting air quality goals. State DOTs and MPOs have three options for providing data for this measure.

The third measure under the CMAQ program is Total Emissions Reduction.

This measure uses data from the CMAQ Public Access System to calculate total emission reductions for applicable criteria pollutants or precursors. A summary of all the national performance management measures rulemakings are listed in Table 1 below.

TABLE 1—SUMMARY OF RULEMAKINGS TO IMPLEMENT THE NATIONAL PERFORMANCE MANAGEMENT MEASURE RULES

Rulemaking	23 CFR part 490 section	Final performance measures	Measure applicability
Safety PM Final Rule.	490.207(a)(1)	Number of fatalities	All public roads.
	490.207(a)(2)	Rate of fatalities	All public roads.
	490.207(a)(3)	Number of serious injuries	All public roads.
	490.207(a)(4)	Rate of serious injuries	All public roads.
	490.207(a)(5)	Number of non-motorized fatalities and non-motorized serious injuries.	All public roads.
Infrastructure PM Final Rule	490.307(a)(1)	Percentage of pavements of the Interstate System in Good condition.	The Interstate System.
	490.307(a)(2)	Percentage of pavements of the Interstate System in in Poor condition.	The Interstate System.
	490.307(a)(3)	Percentage of pavements of the non-Interstate NHS in Good condition.	The non-Interstate NHS.
	490.307(a)(4)	Percentage of pavements of the non-Interstate NHS in Poor condition.	The non-Interstate NHS.
	490.407(c)(1) 490.407(c)(2)	Percentage of NHS bridges classified as in Good condition Percentage of NHS bridges classified as in Poor condition ..	NHS. NHS.
System Performance PM Final Rule.	490.507(a)(1)	Percent of the Person-Miles Traveled on the Interstate That Are Reliable.	The Interstate System.
	490.507(a)(2)	Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable.	The non-Interstate NHS.
	490.507(b)	Percent Change in Tailpipe CO ₂ Emissions on the NHS Compared to the Calendar Year 2017 Level.	NHS.
	490.607	Truck Travel Time Reliability (TTTR) Index	The Interstate System.
	490.707(a) 490.707(b)	Annual Hours of Peak Hour Excessive Delay Per Capita Percent of Non-SOV Travel.	The NHS in urbanized areas with a population over 1 million for the first performance period and in urbanized areas with a population over 200,000 for the second and all other performance periods that are also in nonattainment or maintenance areas for ozone (O ₃), carbon monoxide (CO), or particulate matter (PM ₁₀ and PM _{2.5}).
	490.807	Total Emissions Reduction	All projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs in areas designated as non-attainment or maintenance for ozone (O ₃), carbon monoxide (CO), or particulate matter (PM ₁₀ and PM _{2.5}).

In addition, this final rule establishes the process for State DOTs and MPOs to establish and report targets and the process that FHWA will use to assess the progress State DOTs have made in achieving targets. State DOTs will be required to establish performance targets and assess performance in the above mentioned 12 areas established by MAP-21, and FHWA will assess² their progress toward meeting targets in

10 of these areas³ in accordance with MAP-21 and the FAST Act. State DOTs that fail to meet or make significant progress toward targets in a biennial performance reporting period will be required to document the actions they will undertake to achieve their targets in

³ Serious injuries per vehicle VMT; fatalities per VMT; number of serious injuries; number of fatalities; pavement condition on the Interstate System; pavement condition on the non-Interstate NHS; bridge condition on the NHS; performance of the Interstate System; performance of the non-Interstate NHS under MAP-21; and freight movement on the Interstate System under the FAST Act.

their next biennial performance report. Failure to make progress in the safety metrics requires additional actions as outlined in the published Safety final rule.

The FHWA received extensive and substantive comments on the NPRM. The FHWA made significant alterations to the measures in response to these comments, and a summary of major issues raised can be found at the beginning of Section V, with detailed responses following. The FHWA also recognizes that data collection and analytic capacity are not yet developed

² 23 U.S.C. 148(i) and 23 U.S.C. 119(e)(7).

enough to respond effectively to many commenters' suggestions, particularly in measuring multimodal performance. Therefore, FHWA is working to develop more sophisticated performance metrics and may issue an updated rulemaking on performance measures related to person throughput and multi-modal performance in the future, following completion of ongoing research regarding multimodal system performance measures in Fall 2018.

Lastly, FHWA recognizes that implementation of the performance management requirements in this final rule will evolve with time for a variety of reasons such as: The introduction of new technologies that allow for the collection of more nationally consistent and/or reliable performance data; shifts in national priorities for the focus of a goal area; new federal requirements; or the emergence of improved approaches to measure condition/performance in supporting investment decisions and national goals. The FHWA is committed to performing a retrospective review of this rule after the first performance period, to assess the effectiveness of the requirements to identify any necessary changes to better support investment decisions through performance-based planning and programming and to ensure the most efficient investment of Federal transportation funds. In implementation of this rule, FHWA realizes that there are multiple ways that State DOTs and MPOs can make decisions to achieve more efficient and cost effective investments; as part of a retrospective review, FHWA will also utilize implementation surveys to identify how agencies complying with

the rule are developing their programs and selecting their projects to achieve targets.

B. Summary of the Major Changes Made to the Regulatory Action in Question

This final rule retains the majority of the major provisions of the NPRM, but it makes the following significant changes.

- Removing the proposed NHFP measure for percentage of the Interstate congested.
- Merging the proposed peak-hour travel time measure under NHPP with the proposed excessive delay measure under CMAQ Traffic Congestion into one measure under CMAQ, the PHED measure. This new measure focuses on excessive delay experienced during peak hours in applicable urbanized areas.
- Introducing two new measures in response to extensive public comments:
 - Under NHPP System Performance—a new measure to assess system performance, specifically the percent change in CO₂ emissions from the reference year 2017, generated by on-road mobile sources on the NHS (the GHG measure). All State DOTs and MPOs that have NHS mileage in their State geographic boundaries and metropolitan planning areas, respectively, will be required to establish targets and report on progress. The FHWA will assess every 2 years to determine if a State DOT has made significant progress toward achieving their targets.
 - Under CMAQ Traffic Congestion—a new measure to assess modal share, specifically the Percent of Non-SOV

Travel measure. State DOTs and MPOs are provided the opportunity to use localized surveys or measurements to report on this measure and will be encouraged to report to FHWA any data not currently available in national sources (e.g., bike counts).

- Changing the weighting of the travel time measures from system miles to person-miles traveled, focusing on bus, auto, and truck occupancy levels, and providing opportunities for State DOTs and MPOs to capture more specific local occupancy levels for particular corridors or areas.
- These changes result in one fewer measure than proposed in the NPRM, for a total of 7 measures. Now, four of these are derived from vehicle travel times, three of which reflect all people traveling on the system, a change requested by many commenters.
- Phasing in expanded applicability of the CMAQ Traffic Congestion measures beginning with urbanized areas with a population over 1 million in the first performance period and expanding to urbanized areas with a population over 200,000 beginning in the second performance period. These measures are to carry out the CMAQ program; therefore, the areas will be limited to urbanized areas that contain any part of nonattainment or maintenance areas for one or more pollutants listed in 23 U.S.C. 149 (ozone, carbon monoxide, or particulate matter).
- Taking steps to simplify and otherwise respond to suggestions regarding the data processing and calculation of the measures.

TABLE 2—SUMMARY OF FINAL MEASURES IN THE THIRD PERFORMANCE MEASURE FINAL RULE

Measure groups (program area)	Performance measures	Measure/target applicability	Metric data source & collection frequency	Metric
NHPP	Percent of Person-Miles Traveled on the Interstate That Are Reliable. Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable. Percent Change in CO ₂ Emissions on the NHS Compared to the Calendar Year 2017 Level.	Mainline of the Interstate System within a State or each metropolitan planning area. Mainline of the non-Interstate NHS within a State or each metropolitan planning area. NHS within a State or each metropolitan planning area.	All traffic/vehicles data in NPMRDS or Equivalent—every 15-minutes. All traffic/vehicles data in NPMRDS or Equivalent—every 15-minutes. Annual state total fuel sales data from Highway Statistics and VMT estimates on NHS and all public roads from HPMS.	Level of Travel Time Reliability (LOTTR). Level of Travel Time Reliability (LOTTR). Annual Total Tailpipe CO ₂ Emissions on the NHS.
Freight movement on the Interstate System measure (NHFP).	Truck Travel Time Reliability (TTTR) Index.	Mainline of the Interstate System within a State or each metropolitan planning area.	Truck data in NPMRDS or equivalent data set—every 15—minutes.	TTTR Index.

TABLE 2—SUMMARY OF FINAL MEASURES IN THE THIRD PERFORMANCE MEASURE FINAL RULE—Continued

Measure groups (program area)	Performance measures	Measure/target applicability	Metric data source & collection frequency	Metric
CMAQ	Annual Hours of Peak-Hour Excessive Delay Per Capita.	Mainline of NHS in urbanized areas with a population over 1M/200k in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program.	All traffic/vehicles data in NPMRDS or equivalent data set—every 15 minutes (bus, car and truck volumes in HPMS; occupancy factors published by FHWA.	Total Peak-Hour Excessive Delay person-hours.
	Percent of N SOV Travel.	Urbanized areas with a population over 1M/200k in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program.	ACS, local survey, or local counts (includes bike/pedestrian counts).	n/a.
	Total Emission Reductions.	All nonattainment and maintenance areas for CMAQ criteria pollutants.	CMAQ Public Access System	n/a.

The FHWA updated these and other elements in this final rule based on the review and analysis of comments received. For additional detail on all the changes FHWA made in the final rule, please refer to Sections V and VI of this document. The FHWA has also prepared a comment response document available on the docket for this rulemaking. The following summarizes the regulatory impact analysis for the final rule. Section references below refer to sections of the regulatory text for title 23 of the Code of Federal Regulations (23 CFR).

This final rule adds to subpart A, general information applicable to part 490, to include requirements for target establishment, reporting on progress, and how determinations would be made on whether State DOTs have made significant progress toward NHPP targets. Subpart A also includes definitions and clarifies terminology associated with target establishment, reporting, and making significant progress. Section 490.105 describes the process State DOTs and MPOs must use to establish targets. State DOTs will establish their first statewide targets 1 year after the effective date of this rule. The MPOs have up to 180 days after State DOTs establish their targets to establish their own targets. The FHWA has placed a timeline on the docket that illustrates how this transition could be implemented.

C. Costs and Benefits

The FHWA estimated the incremental costs associated with the new requirements that represent a change to current practices of USDOT, State DOTs, and MPOs.⁴ The FHWA derived the costs of the new requirements by

assessing the additional capital needed and the expected increase in the level of labor effort for FHWA, State DOTs, and MPOs to standardize and update data collection and reporting systems, and establish and report targets.

The FHWA sought opinions from subject matter experts (SMEs) on NHS performance, freight movement, and traffic congestion and emissions to estimate impacts of the final rule. Cost estimates were developed based on information received from SMEs.

To estimate costs, FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate that varied by the type of laborer needed to perform the activity.⁵ Where necessary, capital costs were also included. Many of these measures rely on the use and availability of NPMRDS data provided by FHWA for use by State DOTs and MPOs. Because there is uncertainty regarding the ongoing funding of NPMRDS by FHWA, FHWA estimated the cost of the final rule under two scenarios. First, assuming that FHWA provides State DOTs and MPOs with the required data from NPMRDS, the 10-year undiscounted incremental costs to comply with this rule are \$144.0 million (Scenario 1). Alternatively, under “worst case” conditions where State DOTs will be required to independently acquire the necessary data, the 10-year undiscounted incremental costs to comply with this rule are \$205.5 million (Scenario 2). The total 10-year undiscounted cost is approximately 43 percent higher under Scenario 2 than under Scenario 1.

The final rule’s 10-year undiscounted cost (\$144.0 million in Scenario 1 and \$205.5 million in Scenario 2, both in 2014 dollars) decreased relative to the

proposed rule (\$165.3 million in Scenario 1 and \$224.5 million in Scenario 2, both in 2014 dollars). The FHWA made several changes that affected the cost estimate. These changes include updating costs to 2014 dollars from 2012 dollars and labor costs to reflect current Bureau of Labor Statistics (BLS) data. In addition, FHWA revised the final rule Regulatory Impact Analysis (RIA), found in the docket of this final rulemaking, to reflect: (1) the elimination of three of the proposed performance measures (removing the proposed NHFP measure for percent of the Interstate congested and merging two proposed peak-hour travel time measures under NHPP with the proposed excessive delay measure under CMAQ Traffic Congestion into one measure under CMAQ); (2) the elimination of one of the proposed performance metrics (for the Total Emissions Reductions measure); (3) the elimination of costs for the Initial Performance Report, which State DOTs have already submitted to FHWA; (4) the addition of two new performance measures (Percent of Non-SOV Travel measure and the GHG measure; and (5) the adjustment of level of effort and number of affected entities consistent with the new requirements under the final rule and updated population estimates.

The FHWA expects that the rule will result in significant benefits, although they are not easily quantifiable. Specifically, the rule will allow for more informed decisionmaking at a Federal, State, and regional level for NHS performance-, freight movement-, or congestion and emissions-related projects, programs, and policy choices. The rule will also yield greater accountability because MAP-21 mandated reporting increases visibility

⁴ See Tables 3 and 4 in Section VII, Rulemaking Analysis and Notices.

⁵ Bureau of Labor Statistics Employee Cost Index, 2014.

and transparency. The data reported to FHWA by State DOTs will be available to the public and will be used to communicate a national performance story.

The FHWA performed break-even analyses as the primary approach to quantify benefits. The FHWA identified four variables (or outcomes) for which to estimate break-even thresholds: (1) Number of passenger travel hours, (2) tons of transportation-related carbon dioxide emissions, (3) number of truck travel hours, and (4) kilograms of on-road mobile source emissions, comprising volatile organic compounds, nitrogen oxide, particulate matter, and carbon monoxide. The FHWA selected these variables because it is reasonable to assume that the performance measures will influence each of these variables relative to current baseline levels.

FHWA assumes that there will be no overall change in the total amount of expenditure on highway projects by State DOTs and MPOs. Instead, FHWA assumes that States and MPOs will choose a different mix of projects or delay some projects, relative to what they would have done without the rule, in order to fund projects that help to meet performance goals. There will be some costs to delaying or foregoing some projects, but their will be benefits from projects that are prioritized to meet performance goals. To perform a breakeven analysis, FHWA considered both these benefits and costs and considered how large of a net gain in benefits would be needed to offset the costs of the rule.

After identifying these variables, FHWA combined the final rule costs associated with the performance measures that will influence each variable. The FHWA expects that implementation of four of the rule's performance measures (the Travel Time Reliability measures, the PHED measure and the Percent of Non-SOV Travel measure) will influence passenger travel hours. The FHWA expects that implementation of the GHG measure will influence tons of carbon dioxide emissions. The FHWA expects that implementation of the Freight Reliability measure will influence number of truck travel hours. The FHWA expects that implementation of the performance measure for Total Emissions Reduction will influence kilograms of on-road mobile source emissions.

Two variables (number of passenger travel hours and number of truck travel hours) are associated with performance measures whose costs differ under two

scenarios feasible under the final rule; in Scenario 1, FHWA provides travel time data to State DOTs, and in Scenario 2, State DOTs acquire the necessary data independently. To account for this, FHWA performed the break-even analyses twice for these two variables (*i.e.*, once using Scenario 1 costs, and a second time using Scenario 2 costs). The costs associated with the remaining two variables (tons of carbon dioxide emissions and kilograms of on-road mobile source emissions) do not change under Scenarios 1 and 2; therefore, only one break-even threshold is calculated for each analysis. In all, FHWA presents six break-even thresholds: (1) Number of passenger travel hours under Scenario 1, (2) number of passenger travel hours under Scenario 2, (3) tons of carbon dioxide emissions, (4) number of truck travel hours under Scenario 1, (5) number of truck travel hours under Scenario 2, and (6) kilograms of on-road mobile source emissions.

The results show that the rule must result in the reduction of approximately 3.7 million hours of passenger car travel under Scenario 1 and 5.6 million hours under Scenario 2, 312,000 tons of carbon dioxide emissions, 980,000 hours of freight travel under Scenario 1 and 1.6 million hours under Scenario 2, and 29 million kilograms of total on-road mobile source emissions over 10 years: To generate enough benefits to outweigh the cost of the rule. The FHWA believes that the benefits of this rule will surpass this threshold. Therefore, the benefits of the rule are anticipated to outweigh the costs.

Relative to the proposed rule, the total number of hours of passenger travel time needed to be saved over the period of analysis increased for the break-even analysis covering the Travel Time Reliability measures and the CMAQ Traffic Congestion measures. The undiscounted cost of these performance measures in the final rule decreased from \$88.4 million over 11 years (in 2012 dollars) in the proposed rule to \$86.1 million over 10 years (in 2014 dollars) in the final rule under Scenario 1. Under Scenario 2, costs increased from \$123.9 million over 11 years (in 2012 dollars) in the proposed rule to \$132.2 million over 10 years (in 2014 dollars) in the final rule. The Percent of Non-SOV Travel measure was added to the final rule, but the additional costs of this requirement were outweighed by the cost reductions associated with the removal of the peak-hour travel time reliability performance measures. For the final rule, FHWA added a break-even threshold for the GHG measure

because it was not a part of the proposed rule. The undiscounted cost for Scenario 2 increased because a greater share of the travel time dataset costs under \$490.103 in Scenario 2 was attributable to these Travel Time Reliability measures and the CMAQ Traffic Congestion measures. Specifically, the share of data requirements costs is driven by the proportion of performance measures in each break-even analysis, which for these performance measures increased from 60 percent in the proposed rule to 75 percent in the final rule. In addition, moving from an 11-year period of analysis to a 10-year period of analysis affected the break-even point. The average annual number of hours of travel that need to be reduced increased from approximately 350,000 in the proposed rule under Scenario 1 to 370,000 in the final rule, and from approximately 500,000 in the proposed rule under Scenario 2 to 560,000 in the final rule.

The threshold for the NHFP performance measure break-even analysis significantly decreased in the final rule. This change was largely due to the elimination of the proposed Average Truck Speed performance measure. The undiscounted cost of freight performance provisions in the final rule is \$25.8 million (in 2014 dollars) under Scenario 1 and \$41.1 million (in 2014 dollars) under Scenario 2, compared to \$46.9 million (in 2012 dollars) under Scenario 1 and \$70.6 million (in 2012 dollars) under Scenario 2 in the proposed rule. Average annual number of hours of travel that need to be reduced decreased from 168,044 in the proposed rule to 98,224 in the final rule under Scenario 1, and from 252,896 hours in the proposed rule to 156,874 hours in the final rule under Scenario 2.

Regarding the break-even analysis for Total Emissions Reduction, units were changed from tons to kilograms based on revised rule language. The undiscounted costs of total emissions reduction decreased from \$30.0 million (in 2012 dollars) in the proposed rule to \$18.2 million (in 2014 dollars) in the final rule. The average annual amount of total emissions to be reduced decreased from 4,417 short tons (approximately 4 million kilograms) in the proposed rule to 2.9 million kilograms in the final rule.

Table 2 displays the Office of Management and Budget (OMB) A-4 Accounting Statement as a summary of the cost and benefits calculated for this rule.

TABLE 3—OMB A-4 ACCOUNTING STATEMENT

Category	Estimates			Units			Source/ citation
	Primary	Low	High	Year dollar	Discount rate (%)	Period covered	
Benefits							
Annualized Monetized (\$ mil- lions/year).	None	None	None	NA	7	NA	Not Quantified.
	None	None	None	NA	3	NA	
Annualized Quantified	None	None	None	NA	7	NA	Not Quantified.
	None	None	None	NA	3	NA	
Qualitative	More informed decision-making on congestion-, freight-, and air quality-related project, program, and policy choices; greater accountability due to mandated reporting, increasing visibility and transparency; enhanced focus of the Federal-aid highway program on achieving balanced performance outcomes.						Final Rule RIA.
Costs							
Annualized Monetized (\$/ year).	Scenario 1: \$15,145,514; Scenario 2: \$21,801,333.	.....	.....	2014	7	10 Years	Final Rule RIA.
	Scenario 1: \$14,717,670; Scenario 2: \$21,082,985.	.....	.....	2014	3	10 Years	
Annualized Quantified	None	None	None	2014	7	10 Years	Final Rule RIA.
	None	None	None	2014	3	10 Years	
Qualitative							
Transfers	None						
From/To	From:			To:			
Effects							
State, Local, and/or Tribal Government.	Scenario 1: \$14,768,979 Scenario 2: \$21,795,847.	.....	.....	2014 2014	7 3	10 Years	Final Rule RIA.
	Scenario 1: \$14,347,569 Scenario 2: \$21,077,992.	.....	.....			10 Years	
Small Business	Not expected to have a significant impact on a substantial number of small entities			NA	NA	NA	Final Rule RIA.

II. Acronyms and Abbreviations

Acronym or abbreviation	Term	Acronym or abbreviation	Term	Acronym or abbreviation	Term
		GHG	Greenhouse gas.	NPMRDS	National Performance Man- agement Research Data Set.
AADT	Annual Average Daily Traffic.	HPMS	Highway Performance Moni- toring System.	NPRM	Notice of proposed rule- making.
AADTT	Annual Average Daily Truck Traffic.	HSIP	Highway Safety Improvement Program.	O ₃	Ozone.
AASHTO	American Association of State Highway and Transpor- tation Officials.	HSP	Highway Safety Plan.	OMB	Office of Management and Budget.
ACS	American Community Survey.	IFR	Interim Final Rule.	PM	Particulate matter.
CAA	Clean Air Act.	LOTTR	Level of Travel Time Reli- ability.	PHED	Peak Hour Excessive Delay.
CFR	Code of Federal Regulations.	MAP-21	Moving Ahead for Progress in the 21st Century Act.	PHTTR	Peak Hour Travel Time Ratio.
CMAQ	Congestion Mitigation and Air Quality Improvement Pro- gram.	MPH	Miles per hour.	PRA	Paperwork Reduction Act of 1995.
CO	Carbon monoxide.	MPO	Metropolitan Planning Organi- zations.	PSL	Posted Speed Limit.
CO ₂	Carbon dioxide.	NAAQS	National Ambient Air Quality Standards.	RIA	Regulatory Impact Analysis.
DOT	U.S. Department of Transpor- tation.	NCHRP	National Cooperation High- way Research Program.	RIN	Regulatory Identification Num- ber.
EO	Executive Order.	NHFP	National Highway Freight Pro- gram.	SHSP	Strategic Highway Safety Plan.
EIA	Energy Information Agency, U.S. Department of Energy.	NHPP	National Highway Perform- ance Program.	SME	Subject matter experts.
EPA	U.S. Environmental Protection Agency.	NHS	National Highway System.	SOV	Single Occupancy Vehicle.
FAST Act	Fixing America's Surface Transportation Act.	NHTS	National Household Travel Survey.	State DOTs ..	State departments of trans- portation.
FHWA	Federal Highway Administra- tion.	NHTSA	National Highway Traffic Safety Administration.	TMA	Transportation Management Areas.
FPM	Freight Performance Meas- urement.	NO _x	Nitrogen oxide.	TMC	Traffic Message Channel.
FR	Federal Register.			TTI	Texas Transportation Insti- tute.
				TTTR	Truck Travel Time Reliability.
				U.S.C.	United States Code.

Acronym or abbreviation	Term
VMT	Vehicle miles traveled.
VOC	Volatile organic compound.

III. Background

The DOT implemented MAP-21's performance requirements through several rulemakings. As a summary, these rulemaking actions are listed below and should be referenced for a complete picture of performance management implementation. The summary below describes the main provisions in each rulemaking.

On March 15, 2016, FHWA published a final rule (81 FR 13882) covering the safety-related elements of the Federal-aid highway performance measures rulemaking that included the following: (1) The definitions that are applicable to the new 23 CFR part 490; (2) the process to be used by State DOTs and MPOs to establish their safety-related performance targets that reflect the safety measures; (3) a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and (4) the process State DOTs must follow to report on progress toward meeting or making significant progress toward safety-related performance targets. The final rule also included a discussion of the collective rulemaking actions FHWA intends to take to implement MAP-21 and FAST Act performance related provisions. Elsewhere in this issue of the **Federal Register**, FHWA published a second performance measures final rule which includes the following: (1) Final national performance management measures for the condition of NHS pavements and bridges; (2) the process to be used by State DOTs and MPOs to establish their pavement and bridge condition related performance targets that reflect the final measures; (3) the process State DOTs must follow to report on progress toward meeting or making significant progress toward meeting pavement and bridge condition related performance targets; (4) a methodology to be used to assess State DOTs' compliance with the target achievement provision specified under 23 U.S.C. 148(i); and (5) the minimum levels for the condition of pavement on the Interstate System and bridges carrying the NHS, which includes on- and off-ramps connected to the NHS.

The FHWA published the third national performance management measures NPRM on April 22, 2016, 81 FR 23806. In this NPRM, FHWA proposed national measures for the remaining areas under 23 U.S.C. 150(c)

that were not discussed under the first and second measure rules. The third rulemaking effort proposed performance measures to assess: (1) The performance of the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP; (2) freight movement on the Interstate System; and (3) traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program. In addition, the NPRM proposed State DOT and MPO target establishment requirements for the Federal-aid highway program and performance progress reporting requirements and timing.

When FHWA began implementation of MAP-21, the three related Federal-aid highway performance measure rules were proposed to be published at the same time to allow for a single, common effective date for all three rules. The process to develop and implement all of the Federal-aid highway performance measures required in MAP-21, however, has been lengthy. In light of this, each of the three Federal-aid highway performance measures rules will have individual effective dates. The FHWA expects that even though each rule sets its respective effective date, the compliance schedule for all the rules will be aligned through a common performance period and reporting requirements. A timeline for Biennial Performance Reports is shown in Figure 1 in § 490.105(e)(1).

Although FHWA believes that individual implementation dates will help State DOTs and MPOs transition to performance based planning, FHWA will provide guidance to State DOTs and MPOs on how to carry out the new performance requirements to lessen any potential burden of staggered effective dates.

The FHWA also commits to assist State DOTs and MPOs as they take steps to manage and improve the performance of the highway system by implementing the new rules. As a Federal agency, FHWA is in a unique position to review and share strategies that can improve performance. The FHWA will continue to provide technical assistance, technical tools, and guidance to State DOTs and MPOs to assist them in making performance-based decisions. The FHWA intends to engage at a local and national level to provide resources and assistance to identify opportunities to improve performance and to assist State DOT and MPO compliance with the performance-related regulations. The FHWA technical assistance activities will include conducting national research studies, improving analytical modeling tools, identifying

and promoting best practices, training classes and workshops, preparing guidance materials, and developing data quality assurance tools.

IV. Summary of the Notice of Proposed Rulemaking

This NPRM was published on April 22, 2016 (81 FR 23806). The NPRM proposed a set of national measures for State DOTs to use to assess the performance of the Interstate and non-Interstate NHS for the purpose of carrying out the NHPP; to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ Program.

After consulting with State DOTs, MPOs, and other stakeholders and a review of nationally recognized reports, FHWA proposed eight national performance measures in these areas. To support the new measures, the NPRM proposed to establish standardized data requirements that prescribed State DOTs' travel time and emissions data practices. State DOTs and MPOs would use the National Performance Management Research Data Set (NPMRDS) to calculate the travel time and speed-related metrics, although the NPRM offered flexibility to State DOTs and MPOs to use alternative travel time datasets with FHWA's approval. For Total Emission Reduction measure, the NPRM required State DOTs and affected MPOs to use data included in the existing CMAQ Public Access System.

The NPRM also proposed to establish the processes for State DOTs and MPOs to establish and report progress toward achieving targets, and the process for FHWA to determine whether State DOTs have made significant progress in achieving targets. The FHWA selected the measures, data requirements, and related processes proposed in the NPRM after preliminarily determining that they represented the best choices for achieving consistency among State DOTs and MPOs in compiling accurate system performance, freight movement, traffic congestion, and on-road mobile source emissions performance information, following processes for target setting, and reviewing progress toward targets. The FHWA expected the proposed measures to enhance accountability and support a strong national focus on maintaining and improving the condition and performance of the Nation's highways, while minimizing additional burden on State DOTs and MPOs and maintaining reasonable flexibility for State DOTs and MPOs as they manage risk, differing priorities, and fiscal constraints. Lastly, FHWA anticipated that the proposed

measures could be implemented in the timeframe required under MAP-21, without imposing excessive burden on State DOTs.

System Performance Measures

The four system performance measures proposed in the NPRM were: (1) Percent of the Interstate System Providing for Reliable Travel; (2) Percent of the Interstate System Where Peak Hour Travel Times Meet Expectations; (3) Percent of the Non-Interstate NHS Providing for Reliable Travel; and (4) Percent of the Non-Interstate NHS Where Peak Hour Travel Times Meet Expectations.

System Performance Data Requirements and Metrics

In the NPRM, FHWA proposed calculating the performance measures using two performance metrics: The LOTTR metric and the Peak Hour Travel Time Ratio (PHTTR) metric. Under the proposal, State DOTs and MPOs would be required to calculate these metrics for all applicable roadway segments for the applicable time periods and report them to FHWA annually.

The NPRM also proposed that State DOTs coordinate with MPOs in order to establish and submit reporting segments to be used as the basis for calculating and reporting metrics to the FHWA and for State DOTs and MPOs to calculate the measures to assess Interstate System and non-Interstate NHS performance.

Calculation of System Performance Measures

The FHWA designed the proposed system performance measures to reflect a percentage of the system, by length, operating at a specified level of performance. In the NPRM, FHWA proposed a threshold level that represented reliable travel to highway users of LOTTR of 1.50. This LOTTR level represented the difference between the longer travel times (80th percentile) observed on a roadway segment and those that are normal travel times (50th percentile). For PHTTR, a threshold level of 1.50 represented peak hour travel times that meet expectations of State DOTs, MPOs, and local operating agencies. This PHTTR level represents a condition where observed (or estimated) travel times in large urbanized areas are no more than 50 percent higher than what would be desired for the roadway, as identified by the State DOT and MPO.

Freight Movement on the Interstate System Measures

The two freight movement measures proposed in the NPRM were: (1) Percent

of the Interstate System Mileage Providing for Reliable Truck Travel Time and (2) Percent of the Interstate System Mileage Uncongested.

Freight Movement on the Interstate System Data Requirements and Metrics

The FHWA proposed determining performance measures for freight movement using two metrics: TTTR and the Average Truck Speed metrics. For the TTTR metric, FHWA proposed having the State DOTs use the same basic method as discussed for the LOTTR metric to calculate truck travel time reliability. State DOTs also would calculate the Average Truck Speed metric for each reporting segment, which would be derived from truck travel speeds contained in the NPMRDS travel time data set.

Calculation of Freight Movement on the Interstate System Measures

The FHWA designed the proposed freight movement performance measures to reflect a percentage of the system, by length, operating at a specified level of performance. The NPRM proposed establishing the truck travel time reliability threshold at 1.50 to represent the level at which truck travel times become unreliable. This level represents a condition where travel time could be no more than 50 percent longer than what would be expected during normal travel time conditions. For average truck speed, the NPRM proposed that any travel speeds occurring below 50 mph would be representative of congested conditions for freight flow.

Traffic Congestion Measure

The proposed traffic congestion measure was Annual Hours of Excessive Delay Per Capita.

Traffic Congestion Data Requirements and Metric

The NPRM proposed one metric for traffic congestion: Total Excessive Delay (as measured in vehicle-hours) for each applicable reporting segment on the NHS. To develop the metric, the NPRM proposed that State DOTs with large urbanized areas that contain nonattainment or maintenance areas for any of the criteria pollutants under the CMAQ program use a travel time data set like NPMRDS (as is required for the system performance and freight movement performance measures). The NPRM proposed two threshold travel speeds to indicate when operating conditions have deteriorated to the point that excessive travel time delays would occur. Any measured travel speeds below the threshold would

represent the operating condition level that would result in excessive delays. These thresholds were 35 mph for Interstates, freeways, or expressways and 15 mph for all other NHS roadways.

Using these thresholds and travel time segment lengths, a State DOT would determine the Excessive Delay Threshold Travel Time for each travel time segment to represent the time that it could take for a vehicle to traverse the reporting segment before excessive delay would occur. The excessive delay would be determined by comparing the recorded average travel time to the Excessive Delay Threshold Travel Time for the corresponding segment.

Calculation of Traffic Congestion Measure

The proposed traffic congestion performance measure would be calculated by summing the total excessive delay of all reporting segments in the applicable area and then dividing this total by the population for the applicable area.

On-Road Mobile Source Emissions Measures

The proposed on-road mobile source emissions measure was Total Tons of Emissions Reduced from CMAQ Projects for Applicable Criteria Pollutants and Precursors.

On-Road Mobile Source Emissions Data Requirements and Metric

Under the NPRM, State DOTs and MPOs would calculate the annual emission reductions for projects reported to the CMAQ Public Access System in a Federal fiscal year. The metric would be calculated for each CMAQ-funded project and for each applicable criteria pollutant and precursor. The proposed method would convert the emissions reductions reported in the CMAQ Public Access System from units of kg per day to short tons per year. The emissions reductions would be summed for all projects within the applicable reporting area, by criteria pollutant or precursor, for a Federal fiscal year.

Calculation of On-Road Mobile Source Emissions Measure

Under the NPRM, State DOTs and MPOs would calculate on-road mobile source emissions reductions by summing the annual tons of emissions reduced by CMAQ projects by criteria pollutant, using the 2- and 4-years of available data from the Public Access System.

Potential GHG Performance Measure

The NPRM also sought comment on whether and how to establish a CO₂ emissions measure in the final rule. The NPRM posed questions to the public on how GHG emissions could be estimated and used to inform planning and programming decisions to reduce long term emissions. The NPRM indicated that a potential GHG emissions performance measure would be best measured as the total annual tons of CO₂ from all on-road mobile sources. The FHWA asked for comment on the potential establishment and effectiveness of a GHG measure, and on various considerations in the design of a measure.

Performance Targets

The NPRM described a process to be used by State DOTs and MPOs to establish quantifiable statewide performance targets to be achieved over a 4-year performance period, with the first performance period starting in 2018. In the NPRM, FHWA proposed that a State DOT or MPO could consider a number of factors (e.g., funding availability and local transportation priorities) that could impact the targets they ultimately establish. The FHWA discussed the statutory requirement that State DOTs establish 2- and 4-year targets for the eight national performance measures to assess performance of the Interstate and non-Interstate NHS for the purpose of carrying out the NHPP, freight movement on the Interstate system, traffic congestion, and on-road mobile source emissions within 1 year after the effective date of the rule. The MPOs would establish targets by either supporting the State DOT's statewide target, or defining a target unique to the metropolitan planning area each time the State DOT establishes a target. In accordance with MAP-21, the NPRM proposed providing MPOs with an additional 180-day period to set targets following the date on which the State DOT established their targets.

State DOT and MPO Reporting

The NPRM proposed that State DOTs submit biennial reports to FHWA on the condition and performance of the NHS. The FHWA proposed that State DOTs submit their targets in a baseline report at the beginning of each performance period and report progress in achieving targets at the midpoint and end of the performance period. State DOTs would be allowed to adjust their 4-year target at the midpoint of the performance period. The MPOs would not be required to provide separate reporting to

FHWA. However, State DOTs and MPOs would need to agree on a reporting process as part of their Metropolitan Planning Agreements.

Determination of Significant Progress

The NPRM proposed the method for FHWA to determine if State DOTs achieved significant progress toward their target based on an analysis of estimated condition/performance and measured condition/performance of each of the targets. If applicable, State DOTs could have the opportunity to discuss why targets were not achieved or significant progress was not made. If a State DOT failed to achieve significant progress, then the State DOT would be required to document in their next biennial performance report, and encouraged to document sooner, the actions they would undertake to achieve their targets.

V. Response to Comments

This final rule is based on FHWA's review and analysis of comments received. The FHWA received 8889 letters to the docket, including letters from 43 State DOTs and local government agencies, more than 100 associations and advocacy groups, over 7800 individuals and consultants, and various other government agencies as well as 3 letters cosigned by 19 U.S. Senators. Of all the letters to the docket, 95 percent specifically addressed a request for a multimodal performance measures and greenhouse gas performance measure or both. Given the large number of comments received, FHWA has decided to organize the response to comments in the following manner. This section of the preamble provides a response to the most significant issues raised in the comments received, organized by summarizing and responding to comments that raise significant issues applicable to the NPRM and then those that raise issues applicable to specific subparts of the rule. Responses to all other comments (i.e., comments deemed less significant) are located in a separate comment/response document posted in the docket for this rulemaking.

A. Significant Issues Raised in Comments

The following summarizes the most significant issues raised in the comments to the NPRM and describes how FHWA has addressed these issues. More specific detail regarding these issues is provided in the sections that follow (Sections V-B through V-F).

1. Summary of Significant Issues Raised in the Comments

The NPRM Was Too Focused on Vehicle Travel Time—Many commenters expressed concern that 7 of the 8 proposed measures were based on vehicle travel time data.

The Rule Needs to Account for All People—The largest volume of comments received expressed concern that the proposed measures did not appear to reflect the travel experience of all people using the system and, in particular, those that use public transportation, walk, or bike.

The Rule Needs to Account for Multimodal Travel—Many commenters perceived that the proposed measures would encourage highway expansion and would not recognize strategies that provide for greater transportation choices.

The Proposed Rule Was Overly Complex—Many State DOTs and MPOs raised concern with the complexity of the design of the measure calculations and asked for the method to be simplified.

The Coordination Requirements in the NPRM Would be Difficult to Implement—Many State DOTs and MPOs expressed concern with the level of coordination required to agree on data sources, travel time expectations, and targets for urbanized areas.

The Rule Should or Should Not Include a Greenhouse Gas Measure—Comments were received both supporting and objecting to the inclusion of a GHG emissions measure in the final rule. Supporting comments came from thousands of individual citizens, several State DOTs, and hundreds of other organizations, including local governments, non-profits, and businesses. Comments against a GHG measure came from several State DOTs and 27 industry associations.

The NPRM's Proposed Speed Thresholds Were Problematic—Commenters expressed concerns with the use of an absolute speed threshold to determine congested conditions and the use of a single threshold to define reliable conditions.

2. Summary of Major Changes Made in Response to These Comments

The FHWA made a number of changes in the final rule in response to the comments received. These changes include the following:

The FHWA revised the suite of measures to simplify the rule and reduce the burden of compliance. The final rule contains 7 measures. Four of these are derived from vehicle travel

times, compared to 7 in the NPRM, 3 of which reflect all people traveling on the system. More specifically, the final rule does not include one of the proposed measures that focused on freight congestion and merges three additional proposed measures (two under NHPP System Performance and one under CMAQ Traffic Congestion) into one new measure, focused on excessive delay experienced during peak hours that will be under CMAQ Traffic Congestion. In addition, the final rule includes two new measures:

- **Under NHPP System Performance**—The rule includes a new GHG measure to assess system performance, specifically the percent change in CO₂ emissions from 2017, generated by on-road mobile sources on the NHS. State DOTs will be required to estimate CO₂ emissions based on annual fuel sales, EIA published emission conversion factors, and the proportion of statewide VMT that occurs on the NHS. MPOs will be provided options as to how they calculate CO₂ emissions. All State DOTs, and MPOs that have NHS mileage in their metropolitan planning area, will be required to establish targets and report on progress. State DOTs will report annual CO₂ emissions every 2 years to FHWA in their Biennial Performance Report. The FHWA will assess every 2 years if the State DOT has made significant progress towards the achievement of their target.

- **Under CMAQ Traffic Congestion**—The rule includes a new measure to assess modal share percentage, specifically Percent of Non-SOV, Travel, which includes travel avoided by telecommuting. A minimum option for doing so will be use of the American Community Survey “Journey to Work” data. States and MPOs will be provided the opportunity to use localized surveys or measurements to report on this measure and will be encouraged to report any data not available in national sources today to FHWA (e.g., bike counts).

The final rule simplifies the process. The FHWA simplifies the required data processing and calculation of the metrics. In general these steps include:

- Use of 15 minute travel time intervals instead of 5 minute intervals;
- Consistent time periods for all travel time-derived measures;
- Recognition of commercial data sets that could be pre-approved by FHWA;
- Removal of the requirement to “fill” missing data with travel times at posted speed limits; and
- Use of all vehicle travel times, regardless of speed, to replace missing truck travel times.

- In addition, FHWA is committed to working with State DOTs and MPOs to establish a pooled fund effort to acquire services and tools that will help with the processing and analysis of data.

The final rule modifies measures to address comments regarding the overreliance on vehicle travel times and the need to include multimodal travel. The final rule includes three measures that reflect the number of people traveling on the system, including two measures that have been modified so they are based on person-travel instead of vehicle travel, and a new multi-modal percent of non-SOV travel measure mentioned above. Specifically, the final rule changes the weighting of the Travel Time Reliability measures from system miles to person-miles traveled using overall occupancy factors from national surveys. It also changes the expression of the PHED measure to account for all travelers using the NHS based on volumes and occupancy factors for cars, buses, and trucks. The FHWA will provide occupancy factors based on national surveys and NTD data. State DOTs and MPOs may use more accurate local data if such data are available. The final rule creates the new Percent of non-SOV measure for CMAQ traffic congestion.

Furthermore, FHWA will revisit this issue and consider approaches to more effectively consider multimodal performance in the measures after the completion of ongoing research regarding multimodal system performance measures in fall, 2018.

The final rule addresses concerns with the use of absolute thresholds. The rule changes the proposed excessive delay threshold from 15/35 mph to 20 mph or 60 percent of the posted speed limit, whichever is greater. The rule encourages State DOTs to report the full extent of posted speed limits to the HPMS and requires that these be reported for applicable areas under the CMAQ Traffic Congestion measures. In addition, the rule changes the form of the Freight Reliability measure from one based on the percent of the system providing for reliable travel to an overall average truck reliability index for the Interstate. This change removes the 1.50 threshold in the definition of “reliable travel” for trucks and recognizes incremental improvements that could be made to improve reliability.

The final rule addresses comments regarding applicability of the rule. Specifically, the rule revises the applicability of the CMAQ Traffic Congestion measures to begin with urbanized areas (in nonattainment or maintenance) with populations over 1 million in the first performance period

(4 years begin in 2018) and then expands the applicability in the second reporting period (beginning in 2022) to urbanized areas (in nonattainment or maintenance) with a population over 200,000. Additionally, the final rule moves the date of measure applicability determination up 1 year earlier. The NPRM proposed that FHWA would determine measure applicability based on the most recent available data on October 1 of the first year in the performance period. The final rule changes this to be October 1 of the year before the beginning of a performance period. Finally, the final rule changes the use of the most recent decennial census population to determine measure applicability and to normalize the PHED measure to the most recent annual population estimate published by the U.S. Census.

The final rule relaxes some CMAQ Emission Requirements. The rule revises the definition of “Maintenance Area” to exclude any areas that have completed their 20 year maintenance plan. It also removes the requirement to develop a “metric” (by rolling the metric step into the measure calculation) to simplify the process. In addition, under the final rule, States and MPOs can request their areas to be excluded from the CMAQ performance requirements at the midpoint of the performance period if they reach attainment status (or achieve their 20 year maintenance plan).

B. Subpart A—General Information

1. Implementation Date Alignment and Coordination

The Georgia DOT commented that implementation dates for NPRMs (Asset Management, Pavement and Bridge Performance Measures, etc.) related to the new Statewide and Metro Planning Rule should be aligned to ensure accuracy and consistency. The Florida Metropolitan Planning Organization Advisory Council recommended aligning the various reporting due dates. While each rulemaking may not be finalized at the same time, the commenter requested that FHWA set a future point in time when all reporting of measures will align. The Atlanta Regional Commission (ARC) also recommended aligning the schedule for safety, pavement, bridge, travel time reliability, peak hour travel time, freight movement, traffic congestion, and on-road mobile source emissions target setting and reporting into one consolidated rotation. The New York State Association of Metropolitan Planning Organizations (NYSAMPO), Georgia Association of Metropolitan Planning Organizations, and American

Association of State Highway and Transportation Officials (AASHTO) urged FHWA to use a single effective date for all three performance management rules.

Although FHWA anticipated establishing one common effective date for the three performance management rules, the length of the rulemaking process made that approach impractical. Each rule has its own effective date. This approach allows FHWA, State DOTs, and MPOs to begin implementing some of the performance management requirements before all the rules are issued. In this final rule, FHWA aligned the performance periods (described in § 490.105(e)(4)(i)) and State Biennial Performance Report due dates (described in § 490.107) with the pavement and bridge condition measures for the second performance management rule in effort to consolidate reporting requirements. Throughout the process for all related performance management rulemakings (e.g., National Highway System Asset Management Plan,⁶ National Performance Management Measures for Pavement and Bridge Condition rule), FHWA has worked to coordinate the implementation dates for all of the rules for consistency and time alignment.

2. Reporting and Implementation Dates

The Michigan DOT, Macatawa Area Coordinating Council, and Ozarks Transportation Organization recommended designating the first performance period as a pilot period for the system performance measures. The National Association of Regional Councils (NARC) recommended postponing target establishment requirements to the second performance period. The Orange County Transportation Authority, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation, Texas DOT, and TRANSCOM urged that sufficient time needs to be provided in order to effectively and appropriately develop and deploy target setting and implementation processes. The New York City DOT recommended that FHWA should coordinate with MPOs and State DOTs to set a reasonable and achievable implementation timeline. The COMPASS requested postponing target setting until transportation agencies have had a chance to familiarize themselves with the

NPMRDS data and to develop current and forecasted reliability and speed measures. The AASHTO and Iowa, Maryland, and New Jersey DOTs recommended that FHWA consider a phased approach which includes a 2-year testing period following the effective date of the final rule to allow State DOTs and MPOs to develop “non-binding targets” in order to more fully understand the use of the data and the implications of those targets. The San Francisco County Transportation Authority recommended that FHWA should coordinate with MPOs and State DOTs to set a reasonable and achievable implementation timeline. The DOTs of Idaho, Montana, South Dakota, North Dakota, and Wyoming and AASHTO suggested including “waiver provisions of part 490, in whole or part, with or without time limits or other conditions, and/or extend deadlines, for good cause shown” because they said that the new 23 CFR part 490 is a complex and multi-faceted rule so that there will be unanticipated or unusually difficult circumstances in its implementation. The New York State Association of MPOs noted that a separate NPRM on MPO Coordination and Planning Area Reform was issued jointly by FHWA and FTA on June 27 and said that the proposed rule addresses “MPO geography.” The New York State Association of MPOs recommended that consideration of the implementation of this rule be suspended until the MPO Coordination and Planning Area Reform rule becomes final.

The FHWA appreciates the comments received regarding the implementation dates and reporting dates for this rule. However, MAP–21 establishes the target establishment dates and reporting dates for this rule. State DOT target establishment “not later than 1 year of the effective date of this rule” in § 490.105(e)(1) is based on a statutory requirement under 23 U.S.C. 150(d). The date for reporting progress toward targets of October 1, 2016, is also based on a statutory requirement under 23 U.S.C. 150(e), which requires State reporting “not later than 4 years after enactment of MAP–21 and biennially thereafter.” As indicated in the NPRM, FHWA believes the phase-in approach will allow sufficient time for State DOTs and MPOs to become more proficient in managing performance of non-Interstate roadways and congestion on the NHS in applicable urbanized areas as the coverage of the data becomes more complete in the NPMRDS. The FHWA retains in the final rule the phase-in requirement language in § 490.105(e)(7), (e)(8)(vi), and (f)(5)(vi) for the Non-

Interstate NHS Travel Time Reliability measure in § 490.507(a)(2) and the PHED measure in § 490.707(a), respectively. This phase-in will only require State DOTs to establish 4-year targets for the first performance period for this rule (reported in the first State Biennial Performance Report) for non-Interstate NHS Travel Time Reliability measure and the PHED measure. Under this final rule, at the midpoint of the first performance period, State DOTs will have the option to adjust the 4-year targets they established at the beginning of the performance period in their Mid-Performance Period Progress Report (due in October 2020). This option will allow State DOTs to consider more complete data in their decisions on the 4-year targets for non-Interstate NHS Travel Time Reliability and the PHED measures in applicable urbanized areas.

The Chicago Metropolitan Agency for Planning commented that the effective date of this regulation should be set 1 year after FHWA provides an NPMRDS data set with sample sizes for each epoch-TMC record. The commenter said that this timeline would allow time for agencies to determine which records have low sample sizes and collect probe data.

The NPMRDS has been available since July 2013, and many State DOTs and MPOs have been using the NPMRDS for over 3 years. The final rule and schedule for baseline reports and target establishment clarify how much time there is to prepare the data. In general, State DOTs and MPOs will have approximately 18 months to process data before the first set of metric data is required to be submitted to FHWA. The FHWA has simplified several of the measures to reduce the calculation burden, thereby reducing the amount of time necessary for State DOTs or MPOs to prepare the data.

The FHWA also acknowledges the comment regarding deferring implementation of this final rule until completion of the MPO Coordination and Planning Area Reform rulemaking. The FHWA plans to issue guidance on dealing with metropolitan planning area change during a performance period. The FHWA believes that the implementation timeline provided in this final rule provides sufficient lead time to accommodate any requirements that may arise out of a final MPO rule. So, the FHWA declines to defer the implementation of this rule.

⁶ Final rule on “Asset Management Plans and Periodic Evaluations of Facilities Repeatedly Requiring Repair and Reconstruction Due to Emergency Events” (October 2016)—**Federal Register** Vol. 81, No. 205 RIN 2125–AF57, Docket No. FHWA–2013–0052: <https://www.gpo.gov/fdsys/pkg/FR-2016-10-24/pdf/2016-25117.pdf>.

3. Accessibility and Connectivity

The FHWA received many comments⁷ urging FHWA to establish an accessibility performance measure. The California Association of Councils of Government (CALCOG) said that Federal databases should be made available to States and MPOs to support the monitoring of accessibility metrics. The Southern California Association of Governments (SCAG) said it currently measures accessibility by taking afternoon or PM peak period travel demand model results for the base and forecast years and identifying the percentage of commute or home-based work trips that are completed within 45 minutes. The Delaware Valley Regional Planning Commission (DVRPC) recommended “shorter multimodal journey-to-work travel time than average” and “number of jobs accessible within a given time budget” as accessibility measure.

The FHWA recognizes that accessibility and connectivity are important aspects of successful transportation systems that serve all users. In addition to the comments described above, stakeholder comments on these issues during outreach before publication of the NPRM expressed a variety of views, including that the establishment of an accessibility measure might encourage greater consideration of non-auto travel modes like transit, carpooling, walking, and biking. The FHWA agrees that the time-based measures proposed in the NPRM, such as the traffic congestion excessive delay measure, may not capture modal options, modal usage, or better accessibility. As described above, the final rule establishes a modal share measure that will do much to address

these concerns. While the final rule does not include a measure dedicated to directly assessing transportation connectivity or accessibility, the rule reflects a necessary balancing of performance management needs across a broad spectrum and implementation burdens on the State DOTs and MPOs.

The FHWA is working on several fronts to address accessibility and connectivity issues outside of this rulemaking. The FHWA, in cooperation with FTA, is actively working with transportation operating agencies and planning organizations on efforts to understand and advance best practices in assessing and managing transportation network connectivity to improve public accessibility to essential services. Through the Department’s Ladders of Opportunity initiatives, efforts are currently underway to evaluate how measures can be used to assess accessibility/connectivity.⁸ These initiatives will test different approaches to measure performance in this area that will help DOT better understand if and how accessibility and connectivity performance can be measured effectively at a local, State, and national level. The FHWA will use the results of these efforts to determine if a measure to assess accessibility/connectivity can be integrated into the Federal-aid Highway Program’s performance management requirements in the future.

4. Definition of Mainline Highway

Illinois DOT supports the definition of mainline highways to exclude ramps, shoulders, turn lanes, etc., but expressed concern that the NPRMDS does not exclude these parts of the transportation system. The commenter said that this will lead to extensive manual work to identify and remove these parts of the transportation system from the data it would have to use to comply with the proposed rule.

Texas DOT commented that “mainline highway” includes the primary traveled portion of the roadway and excludes ramps, climbing lanes, shoulders and non-normally traveled pavement surfaces. The commenter said the definition would seem to include managed lanes or high occupancy toll lanes. According to Texas DOT, traffic on these lanes typically travels at a higher rate of speed, which may influence the travel time reliability and percent of the Interstate System mileage that is uncongested. Texas DOT inquired whether FHWA considered these lanes to be part of a “mainline highway.” Florida DOT suggested that TMC should have categories for general

purpose lane, separated managed lane, separated collector/distributor, and ramp.

The Washington State and New York State DOTs, NARC, and Portland Metro Region MPO commented that managed lanes may be omitted in system performance calculations. They stated that the proposed rule would likely mask benefits from HOV and HOT lanes, toll roads, transit, and other operational enhancements and could discourage investment in these best practices. The Washington State DOT and NARC requested that FHWA either seek a way to differentiate the data with the data provider or account for HOV, HOT, toll roads, and other managed lanes. The AASHTO commented that FHWA should allow State DOTs the flexibility to better address the significant role that managed lanes play in the operation of the transportation system, as many regions in the United States have implemented some aspect of management lanes. The AASHTO recommended that FHWA develop an approach in the final rule that allows, but does not require, State DOTs and MPOs to specifically address managed lanes on their roadway network either through an improved NPRMDS that distinguishes between general purpose and management lanes or through supplementary analysis that takes into account the benefits of the managed lanes. The Los Angeles County Metropolitan Transportation Authority and Southwest Energy Efficiency Project commented that the proposed measure for congestion focuses exclusively on vehicle speed, ignoring the significant role that public transit, high occupancy/managed lanes, and active transportation have in reducing congestion and improving overall performance of the regional transportation system.

The FHWA agrees that ramps should not be included in measure calculations or in the NPRMDS dataset as the travel time derived measures are only applicable to mainline roadways. The next procurement of the NPRMDS will have a requirement to report mainline NHS segments only. If any ramp segments appear in the NPRMDS, State DOTs and MPOs should notify FHWA so these ramp segments can be removed in future NPRMDS deliverables.

The FHWA actively promotes managed lanes as a strategy for managing operations, which can include reducing congestion and increasing person throughput. However, at this time, it is difficult to delineate these lanes in both the segment and probe data. Lane-specific speed data are not available through the NPRMDS unless

⁷ American Association On Health and Disability and the Lakeshore Foundation, American Council of Exercise, American Public Transportation Association, BikeWalkLee, California Association of Councils of Government, Chicago Metropolitan Agency for Planning (CMAP), City of San Antonio, Delaware Valley Regional Planning Commission, Los Angeles County Metropolitan Transportation Authority, Mid-Ohio Planning Commission, Mountainland Association of Governments, Utah Department of Transportation, Utah Transit Authority, Wasatch Front Regional Council, Nashville Area Metropolitan Planning Organization, NARC, National Coalition for Promoting Physical Activity, National League of Cities, National Recreation and Park Association, New York Bicycling Coalition, North Front Range Metropolitan Planning Organization, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation, Parks & Trails New York, Regional Transportation Alliance, Southern California Association of Governments, Southwest Energy Efficiency Project (SWEET), Transportation for America (T4A), Trust for America’s Health, Utah Transit Authority, as well as 1,114 citizen letter campaigns sponsored by National Complete Streets Coalition, 150 citizen letter campaigns sponsored by T4A, and 11 citizen letters.

⁸ <https://www.transportation.gov/opportunity>.

the managed lane is listed as a separate NHS facility (*i.e.*, different TMC code). In addition, not all probe data are able to accurately differentiate traffic speed by lane on a roadway. The FHWA does not believe it is possible, at this time, to uniformly separate managed lanes given the available data. If State DOTs have appropriate segment-specific data for managed lanes, State DOTs may certainly track these and include this information in any reports. State DOTs or MPOs may use alternative data sources that include separate segments for managed and conventional lanes provided these data meet the requirements for equivalent data in section 490.103. State DOTs and MPOs are welcome to provide information on managed lanes in performance reports.

5. Data Processing and Conflation of Datasets

Alaska, Arkansas, California, Ohio, Pennsylvania, Utah, Vermont, and Washington DOTs, AMPO, Georgia Association of MPOs, and many others asked FHWA to process the NPRMDS and develop a tool to calculate metrics. Many commenters made the same argument that the burden on States and MPOs is too great if they are each to process the NPRMDS themselves, and that this would represent a greatly inefficient duplication of effort. The AMPO and others agreed that processing the database nationally also would help ensure consistency across the country and thus aid in comparisons nationally. These commenters said that this processing should include all imputation needed to make the data set ready for calculations. Several commenters suggested that FHWA develop a Web-based tool for State DOTs and MPOs to process data and calculate the required metrics. Caltrans further suggested that Federal funding be made available for training. However, the New York Metropolitan Transportation Council suggested that States and MPOs should have the option, if they so choose, to do their own calculations of the required performance metrics and measures.

Others, such as Virginia DOT and TRANSCOM, more generally requested technical assistance and support for States and MPOs in undertaking metric and measure calculation. Michigan DOT suggested a case study of what the process and outputs would look like. The Mayors Innovation Project would like to see commercially available tools to relate speed, modal network availability, and location to help assess not only speed but accessibility.

Many comments noted the particular burden of handling the NPRMDS,

processing and developing the metrics even if they did not call on FHWA to perform these tasks. Commenters expressed concern about not only the time and resources it would take but also if State DOT and MPO staff would even have the skills to perform these tasks at all. Many commenters were concerned that the NPRM required data from both Traffic Message Channel (TMC) networks (*e.g.*, NPRMDS) and linear referencing systems (*e.g.*, HPMS) and that these two datasets are not conflated. Commenters requested that either FHWA provide conflated datasets or a tool for States to use. The FHWA recognizes and appreciates the effort required to download, store, process, and analyze the data in the NPRMDS in order to calculate the metrics required in the rule (and this is taken into account in the RIA). Some organizations have expressed that they are ready and capable of providing technical services and online applications to process and analyze data. The FHWA believes that the most effective way to address the concerns regarding the challenges with conflating data sets (linking travel time data with other roadway information such as traffic volumes) is by having organizations that have the skills and resources to handle and process large data sets provide these services and tools to State DOTs, MPOs, and FHWA. The FHWA is committed to working with State DOTs and MPOs to set up a pooled fund approach to data processing, analysis, metric/measure calculation and reporting, and potentially additional analysis tools. The economies of scale of all interested parties working together should help alleviate burdens. In addition, the Advanced Transportation and Congestion Management Technologies program offers grants that could be used to support the collective need to provide technologies that could be used by State DOTs and MPOs to better manage system performance. The FHWA is using authorized funds under the new Performance Management Data Support Program (FAST Act Sec. 6028) to fund the acquisition of travel time data and to develop enhancements to the HPMS to support the data requirements of this rule.

The FHWA anticipates that the next NPRMDS contract will include HPMS referencing for each TMC segment. This will simplify the process to conflate the travel time data to roadway information contained within the HPMS. The FHWA is also committed to help State DOTs and MPOs understand how they can most effectively process and analyze the travel time data sets. Technical support

is already included in the NPRMDS contract where quarterly webinars are provided and technical assistance is offered on request. The FHWA intends to build on these services to support State DOT and MPO needs for assistance.

6. Population Estimates

The Portland Metropolitan Region MPO recommended regional population be taken from Census-based annual estimates already obtained by MPOs for regional planning purposes from their own staff, reputable academic institutions, or qualified consultancies. The North Jersey Transportation Planning Authority (NJTPA) recommended using the most recent population estimate for the urbanized area. This commenter added that a constant population, as proposed, means that the only changes being measured and reported are the changes in delay; therefore, increases in delay associated with an increased population would not factor into the measure. The T4A also said that America's urban areas are witnessing large population shifts that have the opportunity to be omitted from two 4-year reporting cycles because of the reliance on decennial U.S. Census population estimates. This commenter requested discussion in the final rule for how States and MPOs could use population estimates from 5-year ACS estimates for each year reporting cycle.

The Oregon and Washington State DOTs stated that the proposed language, to keep the population numbers used in the delay measure constant for the duration of the performance period, would give an inaccurate picture of congestion in fast-growing cities as more people use the roadways. The Washington State DOT requested that the delay measure be derived by dividing the total annual excessive delay by an estimated commuter population.

The FHWA agrees with the comments that suggested the use of annual population estimates to determine measure applicability and to calculate the PHED measure. The FHWA believes that the use of annual estimates will provide for a more accurate estimation of population at the time when applicability determinations are made and when annual measures are calculated.

Therefore, the final rule uses the most recent annual population estimate published by the U.S. Census Bureau (in lieu of Decennial Census population estimates) to compute the PHED measure and to determine which State DOTs and MPOs will be implementing

CMAQ traffic congestion measures (both PHED and non-SOV Travel). Please see discussion section for §§ 490.709(g) and 490.105(e)(8)(iii) and (f)(5)(iii) for more details. To maintain consistency throughout all CMAQ measures, the final rule also uses the most recent annual population estimate published by the U.S. Census Bureau to determine which MPOs are required to develop and submit MPO CMAQ Performance Plan (Section 490.107(c)(3)).

7. Replacement of Missing Travel Time Data

Several commenters expressed concern about replacing travel time data missing from the NPMRDS with imputed data. Chicago Metropolitan Agency for Planning stated that imputation should be avoided as it may lead to under- or over-reporting, depending on the level of congestion present, and suggested that if imputation is used, FHWA should apply consistent rules for the replacement of missing values for all measures. Ozarks Transportation Organization, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation, Association of Metropolitan Planning Organizations, and Puget Sound Regional Council argued that imputation, while perhaps unavoidable, would increase inaccuracy in data sets.

Some commenters, including North Jersey Transportation Planning Authority and Florida DOT, expressed general support for replacing missing travel time data with imputed data. Nebraska Department of Roads argued that the proposed restriction on using imputed data is inconsistent with the current use of estimates in the NPMRDS and further recommended that FHWA permit the use of estimates in alternative data sets. The AASHTO suggested that imputed data be smoothed and include information on whether the data were imputed at multiple confidence intervals. The commenter also recommended that in the future FHWA should require the provider(s) of NPMRDS data to follow recognized, industry-accepted methods for imputing incomplete or missing data. The New York State Association of Metropolitan Planning Organizations argued that the use of imputed data should be conditional on vendors providing details about the data (e.g., the methodology used to develop them).

Many commenters expressed support for imputation based on sources other than speed limit data, arguing that the alternatives have tested well in the field and are more accurate, efficient, and sophisticated than speed limit data are, and recommended that FHWA allow

States the flexibility to use such data from providers like HERE, INRIX, and TomTom. These commenters included DVRPC, New York State Association of Metropolitan Planning Organizations, AASHTO, and the State DOTs of Texas, Washington State, Oregon, Connecticut, New York, and Pennsylvania. The AMPO suggested that where observed data are unavailable, travel time interpolated between adjoining segments should be used instead of speed limit data. The Kentucky Transportation Cabinet recommended that, depending on the time of day for which data is required, imputation could involve either treating missing data as a maximum travel time or inserting historical data into the data set.

The final rule provides State DOTs the flexibility to select and use an alternative data set to the NPMRDS provided the data are considered “equivalent” as defined in section 490.103(e). The FHWA has established these requirements to ensure, through FHWA approvals, that data from different data sources are nationally comparable. The FHWA recognizes the concern with the degree of missing data and outliers in the NPMRDS as it existed when the NPRM was published. The FHWA supports approaches to filling in missing data provided they are based on observed travel during the same timeframe and roadway location, which is typically referred to as path processing. The original contract for the NPMRDS only allowed point-based probes to be included in the dataset (*i.e.*, that determine travel time based on the detection of a vehicle at one point in location). This method often recorded vehicles waiting at signalized intersections or missed them entirely during the detection period (5 minutes). The FHWA is currently updating the NPMRDS to allow for the determination of individual travel times during specified time intervals based on tracking the movement of single vehicles passing through a series of segments. This approach will maintain FHWA’s desire to use observed travel times without the challenges associated with single point detection. The FHWA is confident that travel time providers will be able to provide data sets that follow this approach.

To maintain consistency at a national level and to maintain an acceptable level of bias from the actual travel times occurring on the roadway throughout the year, FHWA discourages the use of methods to predict travel times based on historical trends or reference speeds. Consequently, to address concerns regarding the prohibition of the use of

imputed travel times, FHWA has revised the final rule in section 490.103(e)(5)(iii) to allow “observed” travel times that may be derived from travel times reported over a longer time period of measurement (path processing or equivalent). The final rule will not allow missing data to be filled with data that are imputed from historical data or predicted based on statistical analysis approaches.

8. Segment Lengths

The AASHTO and Illinois DOT expressed concern that the NPMRDS TMC segments are not consistent lengths across months and years. To address this issue, AASHTO recommended that FHWA require the NPMRDS provider to maintain segment definitions existing at the start of the year throughout the year. Because under this scenario, new roads and interchanges would not show up in the NPMRDS until the year following their opening, AASHTO commented that this approach would allow some time for State DOTs to get familiar with how new facilities are being used by the traveling public before they need to set targets and report on their performance. The Illinois DOT commented that the changing TMC segments would result in having to maintain conflation across each month’s data in order to be able to analyze the measures and complete the calculations. The commenter asserted that this would impact the measures for a segment over time as it would not be comparing similar segments across the 4-year reporting timeframe.

The AASHTO, Illinois, Minnesota, and Georgia State DOTs, Florida Metropolitan Planning Organization Advisory Council, Hampton Roads Transportation Planning Organization, Ozarks Transportation Organization, and Denver Regional Council of Governments recommended that FHWA allow State DOTs and MPOs flexibility to establish reporting segments that best reflect the needs of an individual State, which may be longer than the proposed limit of 1/2 mile for urban areas and 10 miles for non-urban areas. For example, AASHTO and Florida Metropolitan Planning Organization Advisory Council said that the segments could be based on logical termini, such as intersecting NHS facilities or the start or end of an urbanized area. The AASHTO and Connecticut DOT asserted that the proposed maximum length of reporting segments (1/2 mile in urbanized areas, 10 miles in non-urbanized areas) for a reliability measure are not consistent with prevailing practices in calculating travel time reliability measures (e.g., SHRP 2 Reliability Program).

Specifically, New York State Association of Metropolitan Planning Organizations proposed that FHWA permit urban travel time segments up to 5 miles in length. Requesting to see FHWA's research behind the proposed reporting segment length caps, Oregon and Washington State DOTs recommended that FHWA revise proposed § 490.103(f) so as not to be misinterpreted as allowing longer groups of TMCs (one "reporting segment") if one of the TMCs within the group is longer than the threshold.

The Great Lakes Regional Transportation Operations Coalition and University of Wisconsin-Madison Traffic Operations and Safety Laboratory recommended that FHWA remove the option to aggregate segments if using the NPMRDS, arguing that it is unnecessary, would involve extra work, and could invite a sort of gerrymandering where poorly performing TMCs can be bundled with better TMCs so measures meet targets. The Minnesota and New Jersey State DOTs, NJTPA, Metropolitan Council, and Wichita Area Metropolitan Planning Organization requested a clarification on the treatment of segments that cross MPO and/or urbanized area boundaries. The NJTPA said that the proposed rule is unclear as to how reporting segments that cross MPO and/or urbanized area boundaries are to be handled. Moreover, it said that none of the measures that MPOs need to report at the MPO level mention how to handle reporting segments that cross an "MPO boundary."

The NJTPA also urged FHWA to revise the rule to allow one set of reporting segments for the freight measures and another set of reporting segments for the remaining measures, reasoning that the standard for locating TMC segment endpoints is not standardized across commercial vendors. According to this commenter, the proposed rule would effectively require that, if a State opts to use an equivalent data set, it would have to use the TMC definitions used by HERE, the vendor that provides the NPMRDS. In order to clarify the default reporting segment in the event that States and MPOs do not agree, AASHTO, Illinois DOT, and Connecticut DOT recommended that FHWA revise the definition of "reporting segment" to say that a reporting segment is the segment set forth in the NPMRDS data set provided by FHWA (or an alternative data set used by the State) unless the State and any applicable MPO determine otherwise. New York State Association of Metropolitan Planning Organizations also recommended that

the definition of "reporting segment" address the process of which agency defines reporting segments within the urbanized area or MPA, proposing that FHWA amend the proposed definition to state "the State and MPOs cooperatively define . . ." Oregon and Washington State DOTs requested clarification regarding what type of documentation will be adequate for demonstrating coordination between State DOTs and MPOs for establishing reporting segments.

The FHWA recognizes that changes in segment length can present challenges in metric calculation. Segment length changes in the NPMRDS can occur sometimes due to the provider splitting long segments or new roads/improvements necessitating changes in the segmentation. Although it will be difficult to lock in segment lengths for a full year, FHWA will work with the NPMRDS provider to limit segment changes and document any changes made. Also, the proposed Pooled Fund approach to processing/analysis could help alleviate this issue.

In regard to aggregation, although there remains an option to join travel time segments into Reporting Segments of longer lengths, State DOTs are not required to take this action. The FHWA has retained the option to allow State DOTs to relate Travel Time Segments to their own roadway segmentation and to ensure travel time data are used at a sufficiently detailed level to provide useful metric calculations. In response to several comments asking if segments in urban areas could be longer than 0.5 miles, in this final rule, FHWA has changed the maximum length for reporting segments to one mile in urban areas, unless an individual Travel Time Segment is longer.

The FHWA intends to develop guidance to assist State DOTs and MPOs in the processing of segments to calculate metrics. The final rule does not specify how segments that cross boundaries should contribute to the metric. It is anticipated that data processing guidance will recommend that segments should contribute to the metric only if the entire length of the segment is contained within the applicable area.

9. NHS Coverage in the NPMRDS Data

The Great Lakes Regional Transportation Operations Coalition and University of Wisconsin-Madison Traffic and Safety Laboratory commented that NHS coverage in the NPMRDS changes with each static file change, which would alter the calculations. The commenter recommended that calculations be based

on only those TMCs that exist in all static file versions within a year.

The Illinois DOT commented that since NPMRDS TMC segments are not consistent lengths across months and years, it would be difficult to perform proper analysis because States would not be comparing similar segments across the 4-year reporting time frame. Ozarks Transportation Organization provided a similar comment and noted that the NPMRDS would need to be adjusted regularly in order to be used for performance measures and reporting.

The FHWA will work with the NPMRDS contractor to make sure the NHS updates are reflected in the NPMRDS travel time data as soon as is possible. There are inherent delays in providing data on a system that can change, and FHWA has addressed the issues in the rule by making certain requirements consistent throughout a reporting period. Comments received in the second performance measure rulemaking (pavement and bridge conditions) suggested that the impact of measure outcomes due to variations of NHS limits from year to year are not sufficient enough to warrant locking in one definitive NHS limit for a full performance period. This final rule follows the same approach.

10. Travel Times

Several commenters expressed support for travel times of 15 minutes (or longer), being used for the travel time-based measures. The commenters asserted that this would lead to, among other benefits, fewer bins with no data, reduced data storage burden, less effort required for quality control and quality assurance, and greater utility for members of the public interested in the data. Commenters argued that the higher level of granularity available in data from 5-minute bins, which provides more precision but not necessarily greater accuracy, does not confer enough additional benefits to justify the extra burden they would impose. Other commenters stated that due to low traffic volumes there may not be any travel time recorded in many 5-minute segments.

The NARC commented that if FHWA were to follow its recommendation for processing data centrally, FHWA could then obtain the data in 5-minute (or even 1-minute) bins but provide them to States in 15-minute bins. The AASHTO expressed support for the use of 5-minute bins for national-level performance reporting but stated that data with higher temporal resolution (e.g., 1-minute bins) have benefits for other purposes such as research.

Southeast Michigan Council of Governments expressed concern that for data on freight movements, 5-minute bins may not contain enough data points to maintain the anonymity of individual trucks. The Maine DOT commented that 60-minute bins would be better suited to its needs due to the limited and seasonal nature of its congestion and reliability issues as a rural State with low population density.

The FHWA agrees with and appreciates the concerns raised by commenters on the challenges with using 5-minute temporal granularity in the calculation of travel time metrics. Using 15-minute time periods would significantly simplify data analysis in terms of the size of the data set; FHWA estimates that the data set would be reduced by approximately two-thirds. The FHWA received many comments noting the amount of missing data when using 5-minute time intervals. The FHWA conducted an analysis to compare the amount of missing data when using 5-minute time periods to 15-minute time periods and determined that, for the segments analyzed, switching to 15-minute time periods improved data completeness by 25 percent to 30 percent for non-Interstate NHS segments; the resulting NHPP reliability measures differed by no more than 5 percent for Interstate highways. In addition, individual segment level LOTTR values were nearly identical, with an average difference of less than 1 percent for all of the segments evaluated. The assessment showed the greatest difference for the PHED measure, which was likely due to the prevalence of missing data at the 5-minute interval. The FHWA recognizes that larger time intervals reduce the level of specificity and granularity, but believes that the benefits of a more complete data set will allow for more accurate measure calculations. The FHWA does encourage the use of more granular time intervals (1 to 5 minutes) to carry out segment level analysis to better identify strategies to address issues impacting roadway reliability and congestion, but this information is not required to be reported to FHWA.

11. Alternative Data Sets

The AASHTO expressed support for FHWA's intent to make the NPMRDS available to State DOTs and MPOs for use in calculating performance measures and to allow States to use an alternate data set. Several State DOTs questioned FHWA's ability to continue to provide the NPRMDS data free of charge in the future raising concerns with the burden on State DOTs to acquire this data on their own if this

were to happen. Commenters also expressed concerns with the costs associated with the development of alternate data sets that would comply with the proposed travel time data requirements.

The NJTPA asked if equivalent travel time data sets can include data from different vendors or sources or both, as long as it satisfies FHWA requirements. For example, the commenter recommended that FHWA consider a "hybrid" or "fused" data set (such as the TRANSCOM "Data Fusion Engine" travel time data set) that includes travel times from various agency sensors (e.g., BlueTOAD sensors, toll transponder readers, Sensys pucks) as well as commercial probe data. Iowa DOT asked if the requirement that data "be populated with actual measured vehicle times and shall not be populated with travel times derived from imputed methods" eliminates any specific alternative data sources (e.g., INRIX) from consideration.

Several commenters requested detailed guidance on the approval process for using equivalent data sources in place of, or in conjunction with, the NPRMDS. In particular, the commenters asked what the approval process will look like, who will have the authority to grant the approval, how quickly the approval will be granted after a formal request is made, what information will be required for approval, what happens if FHWA does not approve the data set, and how frequently requests can be made by each State. The commenters also recommended that FHWA include in the final rule a time limit for such requests, stating that approval will be granted if no action is taken once the time limit expires. Rather than requiring State DOTs to get approval for alternate data sets, the Great Lakes Regional Transportation Operations Coalition and the University of Wisconsin-Madison Traffic Operations and Safety Laboratory suggested that it would be more efficient for a central entity (e.g., CATT Lab or TTI) to house and process travel time data, produce the metrics, and provide results to State DOTs and MPOs for use in target setting and reporting.

The Delaware Valley Regional Planning Commission, on behalf of the Partners Using Archived Operations Data, recommended that FHWA streamline the process to approve alternate data sets. Hampton Roads Transportation Planning Organization and the State DOTs of Virginia and Minnesota suggested that FHWA approve specific alternate data sets (such as INRIX and TomTom) rather

than requiring each State to request approval for these sources.

The FHWA believes that the use of the NPMRDS data set by all States and MPOs will promote national consistency among all of the measures. However, FHWA is willing to review commercially available travel time data sets to pre-approve those that are determined to be "equivalent" to the NPMRDS. The FHWA is not currently aware of any commercial data set that is "equivalent," but requests that if a State DOT or MPO believes that an alternative data set is "equivalent," then that State DOT or MPO should submit a request to FHWA. The FHWA appreciates that State DOTs and MPOs will need to know if a commercially available data set will be considered equivalent to the NPMRDS before financial resources are used to acquire data. Therefore, FHWA will consider alternative data set providers, on request by a State DOT or MPO, before their decision to use the data to meet the requirements of this final rule. If FHWA reviews a request and determines that the alternative data set is not "equivalent," then the State DOT or MPO must use the NPMRDS data set. Finally, FHWA retained the proposed regulation to use a single travel time data set (NPMRDS or equivalent) for all travel time derived metrics in this final rule. The FHWA believes that, as the metrics apply to the same roadway segments with the same traffic, it is important to use the same data set to calculate the metrics.

The FHWA intends to approve requests for alternate data sets in a timely manner such that the requested data set can be used by the State DOT beginning on January 1st of the year following the request. State DOTs should contact FHWA as soon as practical when considering alternate data sets to provide for sufficient time for the State DOT to acquire the data for use. The October 1st deadline is included in the final rule as the latest date the FHWA believes an alternate data set can be approved for use by the next calendar year. For clarification, in response to questioned raised by commenters, the final rule allows for alternate data sets to be combined with the NPMRDS in whole or in part to meet the travel time data requirements of this rule.

12. Corridors

Several commenters expressed a preference for a corridor-based approach to evaluate system performance instead of a segment-based approach and system-wide performance measures. The New York State DOT requested that the final rule to focus on corridors,

particularly in urban areas where congestion is likely to occur, that are defined by States and MPOs in ways that are meaningful for State and regional planning. The Washington and Oregon DOTs use a corridor-based approach that they assert allows the State to manage systems based on important functions and characteristics that will be missed by simply having urban/non-urban measures system-wide.

As part of an internal evaluation of the performance measures, Purdue University compared segment-based results with a corridor-based approach. According to this commenter, the corridor-based results were consistent with the segment-based analysis in that Interstate routes tended to be more reliable, but the routes for which there were numerous individual segments with a number of high LOTTR or PHTTR values did not exhibit these high values in a corridor-based analysis.

Oregon Metro Council and the Joint Policy Advisory Committee on Transportation urged FHWA to develop an integrated multimodal corridor approach to measuring person throughput and congestion that includes HOV lanes, public transit, and biking and walking facilities.

The California Association of Councils of Government (CALCOG) and others commented that freight measures specifically should be focused at the corridor level.

The FHWA recognizes that many State DOTs and MPOs use "trips" as the basis for reliability determination and fully supports that approach. However, that approach requires a working knowledge of how the system operates at a corridor level. Determining the length of analysis for these trips is not something that can easily be done in a nationally-consistent way. Instead, FHWA determined that looking at segment level performance was a satisfactory way to provide a consistent approach to measure system performance and traffic congestion in this rule. While State DOTs and MPOs are only required to assess progress on full system performance in this rule, State DOTs and MPOs may use the metrics to assess corridor-specific performance and use corridor-specific information to monitor progress, analyze trends, and establish targets.

13. Weather and Construction Impacts

Several commenters expressed concern that extraordinary events such as non-recurring inclement weather, prolonged construction, large gatherings, and insufficient funding will make target setting difficult and will

impede agencies' ability to achieve successful performance. Commenters requested FHWA take these events into account in the final rule.

The AASHTO recommended that FHWA allow State DOTs and MPOs the flexibility to exclude from calculation and targets roadway segments for periods of inclement weather conditions using a consistent approach and data (e.g., National Weather Service reports and data archives).

The Illinois DOT suggested reports should be based on the number of days and/or center-line miles of facilities that are under construction or impacted by weather in order to keep the data set whole. The NARC suggested that there should be an opportunity for MPOs and States to explain targets and results as part of the reporting protocol to address unique circumstances.

The Mid-Ohio Planning Commission suggested including all extraordinary events, as all entities will undertake construction, and this measure would remain consistent with the bridge and pavement rule, which does not change factors for areas with more inclement weather. The Great Lakes Regional Transportation Operations Coalition and the University of Wisconsin-Madison Traffic Operations and Safety Laboratory reasoned that extraordinary events are in the far "right tail" of travel time distributions and would not affect the 80th percentile travel time.

The FHWA believes that reliability measures should include travel times during weather- and construction-related events to ensure that the measure reflects the efforts by transportation agencies to maintain and improve roadway operations. The FHWA further believes that the 80th percentile travel time used in the calculation of the NHPP reliability metric will exclude a majority of the longest travel times that occur as a result of extreme congestion events. The variability in travel time resulting from construction operations and other events that impact traffic flow are expected to be included in the measure as operational improvements and management should be able to help alleviate impacts from these events. The FHWA modified the NHFP reliability measure to remove the threshold that would determine if a segment is providing for reliable travel. The FHWA believes that this change will minimize the impact that extreme weather events could have on the metric and measure outcome. The FHWA has also added a provision for all the travel time derived measures that allows removal of travel times from the metric calculations when the roadway is closed.

The FHWA has retained the proposed provisions in section 490.109(e)(5) that consider extenuating circumstances, allowing State DOTs to explain the factors they considered when establishing targets and the circumstances that may have impacted their ability to make progress in achieving those targets. The FHWA believes that these provisions will allow State DOTs to document the impact of extreme weather events on performance expectations and their ability to manage system performance.

14. Holidays

The FHWA received several comments on whether holidays should be excluded from the travel time-based measures and requested that these exclusions be consistent across all travel time-based measures.

The AMPO pointed out that there are issues with consistency in calendar coverage in the proposed rule; holidays were excluded in the PHTTR metric, but not in the LOTTR metric. The commenter expressed concern that these inconsistencies, if not clearly justified, have the potential to add confusion and increase the burden in implementing these measures. A consistent set of time periods would be easier to understand.

Puget Sound Regional Council proposed that a consistent set of weekday time periods that excludes holidays would be easiest to understand.

The AASHTO, echoed by New Jersey, Missouri, Washington DOTs and others, requested days to be grouped similarly (non-holiday weekdays, weekends, and holidays) and for any excluded holidays to be specified in the final rule. They also asked for guidance on how to manage holidays that fall on weekends and are observed on a weekday.

The FHWA agrees with commenters that the burden required to identify and exclude holidays from the metric calculations is not warranted. The FHWA compared measure results with the inclusion and exclusion of holidays in the calculation. The analysis indicates that the inclusion of holidays in the travel time-based measures did not have a statistically significant effect on the annual metric and measure calculations. For this reason, the rule now requires that holidays be included when determining the metric.

15. Annual Reporting of Travel Time Metrics

The Oregon and Washington State DOTs commented that annual reporting of LOTTR and PHTTR metrics is too burdensome.

The FHWA recognizes the burden associated with the calculation of travel time based metrics, particularly in the first years of implementation. However, FHWA believes that through the development of standard processing routines the metrics can be calculated with a reduced burden. The proposed pooled fund effort should help alleviate the burden of annual reporting while providing consistent performance monitoring data for use in all performance management activities.

16. Establishing Performance Targets

The Atlanta Regional Commission and the Florida Metropolitan Planning Advisory Council stated that they appreciate the flexibility provided to State DOTs and MPOs regarding the establishment of improving, constant, or declining targets and they asked that this implementation philosophy be carried forward to the final rule. Several commenters⁹ recommended that specific regulatory language be included in the final rule to confirm that State DOTs and MPOs are allowed to establish improving, constant, or declining targets.

The FHWA believes that State DOTs and MPOs have the discretion to establish their targets. The MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. The FHWA believes that this rule does not impair the ability of State DOTs and MPOs to establish constant or declining targets. Thus, FHWA believes that specific language describing potential target level scenarios in the regulatory language is unnecessary.

17. Target Establishment Frequency

Several commenters¹⁰ stated that 2-year and 4-year timeframe will not reveal any meaningful progress toward targets or strategies implemented in that those timeframes. Others¹¹ expressed concerns that “over-emphasis on short-term over longer term targets may present an unintended obstacle to developing innovative, sustainable, and comprehensive solutions or to undertaking larger projects that can take many years to plan and implement.” The New York State Association of MPOs stated that the biennial reporting would give a snapshot of performance, but would also not reflect the results of

projects that have not been in place long enough for their impact to be measured. This commenter suggested that it may be useful to include in the report a list of projects implemented since the previous reports. The Pennsylvania DOT, COMPASS, and DVRPC recommended a broader time-horizon in the final rule. The AASHTO and several State DOTs¹² recommended providing State DOTs and MPOs the opportunity to voluntarily set long-term targets, not just 2- and 4-year targets, and to do so completely outside of the Federal regulatory framework. The Mid-Ohio Regional Planning Commission (MORPC), CMAP, and Portland Metropolitan Area MPO commented that targets should be established as part of each MPO’s Metropolitan Transportation Plan development or update cycle.

As stated in the NPRM, established targets (2-year and 4-year) would need to be considered as interim conditions/performance levels that lead toward the accomplishment of longer-term performance expectations in State DOT long-range statewide transportation plans and NHS asset management plans. In order to avoid confusion, FHWA used the term “longer-term performance expectations” in the NPRM to distinguish between longer-term targets and the interim anticipated condition/performance (*i.e.*, 2-year and 4-year targets) toward those longer-term performance expectations. The FHWA recognizes the importance of using a longer time horizon for planning and programming projects that considers and evaluates temporal tradeoffs between feasible improvements for more efficient and effective investment decisions. The FHWA strongly recommends that State DOTs and MPOs consider longer time horizons, which look beyond 4 years (*i.e.*, multiple performance periods), for planning and programming of projects, so identification and selection of those projects is guided by the longer term performance expectations. The purpose of the performance period is to measure and evaluate condition/performance, which should not be assumed to be a “planning, programming, project delivery, data collection, data reporting” cycle of individual improvement projects or a program of projects. Thus, the performance period and long-range planning (LRP) cycles look at different time periods and do not have to be aligned to be effective. Therefore, FHWA retains the proposed language in § 490.105(e)(4) and (5) in this final rule.

18. Target Adjustment Schedule

The Washington State and Oregon DOTs, AMPO, and Fairbanks Metro Area Transit System supported the proposed approach for allowing State DOTs to adjust an established 4-year target in the Mid Performance Period Progress Report. On the other hand, New York State Association of MPOs, State DOTs of South Dakota, Connecticut, Utah, and Alaska, and AASHTO recommended the flexibility to be able to adjust targets annually, if critical assumptions underlying performance targets have changed sufficiently to affect target values.

The FHWA believes that MAP-21 gives FHWA the discretion to establish requirements for targets. The FHWA has determined that State DOTs or MPOs may establish any target to satisfy the requirements for the performance management measures. The FHWA believes State DOTs have the authority and flexibility to establish targets for the performance measures. However, FHWA does not believe MAP-21 provides State DOTs and MPOs the authority to adjust or revise targets at any time at their discretion. The FHWA believes that 23 U.S.C. 150 provides FHWA the authority to establish requirements for targets, and that some requirements must be established so that accountability and transparency are instilled in the performance management process. As discussed in the NPRM, the FAST Act amended the number of determinations¹³ in MAP-21 from “two consecutive determinations” to each determination, that FHWA will make on a State DOT target (determined that State DOT has not made significant progress towards achieving its target) before that State DOT is required to take action.¹⁴ In response to this change, FHWA felt that an approach is necessary to provide State DOTs the same opportunity to make significant progress for 4-year targets as for the 2-year targets. The FHWA believes that 4-year target adjustment through the Mid Performance Period Progress Report will provide that opportunity because the actual time horizon (the duration between the target reporting date and the date which a target is established for) for State DOTs to consider in establishing 2-year targets and adjusting 4-year targets will be the same. For example, the duration between 2-year target reporting (via Baseline Performance Period Report) and the

⁹ AASHTO, Alaska, Arkansas, Connecticut, Florida, Idaho, Illinois, Montana, Missouri, North Dakota, South Dakota, Wyoming DOTs, and National Association of Regional Councils.

¹⁰ COMPASS, New York State, Pennsylvania DOT, DVRPC, and New York State Association of MPOs,

¹¹ AMPO, New Jersey DOT, and NJTPA.

¹² Alaska, Connecticut, and Illinois,

¹³ 23 U.S.C. 119(f)(7).

¹⁴ 23 U.S.C. 119(f)(7)—Require to provide a description of the actions the State will undertake to achieve the targets in its biennial performance report.

midpoint of a performance period (*i.e.*, the date which 2-year targets are established for) will be the same as the duration between adjusted 4-year target reporting (via Mid Performance Period Progress Report) and the end of a performance period (*i.e.*, the date which 4-year targets are established for). In response to the comments suggesting annual target adjustment, the State Biennial Performance Reports has the appearance that State DOTs would consider 2-year time horizon for establishing a 2-year target or adjusting a 4-year target, as the biennial reporting frequency may suggest. However, as discussed above, the actual time horizon for establishing 2-year targets and adjusting 4-year targets that State DOTs have to consider is much shorter than 2 years. The FHWA feels that this frequency of adjustment allows a State DOT to address changes they could not have foreseen in the initial establishment of 4-year targets while still maintaining a sufficient level of control in the administrative procedure necessary to carry out these program requirements in an equitable manner. For this reason, FHWA retains the language in section 490.105(e)(6), as proposed in the NPRM.

19. Ownership & Applicability of Measures/Targets

The South Jersey Transportation Planning Organization, Coalition of Great Lakes Regional Transportation Operations, COMPASS, and AMPO stated that State DOTs and the MPOs do not have any direct control over the NHS.

The statutory language in MAP-21 and the FAST Act apply the performance management requirements (23 U.S.C. 150), NHPP (23 U.S.C. 119), and CMAQ (23 U.S.C. 149) to the NHS/ Interstate System and not to “State DOT owned or operated” Interstate System or “State DOT owned or operated NHS.” The MAP-21 does not provide unique definitions to the terms “State” or “MPO” for purposes of 23 U.S.C. 150, 119, 167, and 149, and thus these terms have the same meaning as defined elsewhere in Title 23 U.S.C. Accordingly, FHWA retains the language in section 490.105(d) which requires State DOTs and MPOs to establish targets for the entire NHS and Interstate System for the entire geographical area within the State or metropolitan planning area, regardless of ownership.

20. Fiscal or Calendar Year Based Performance Periods

The Georgia DOT commented that some reporting requirements are based

on the Federal fiscal year and others on a calendar year. The commenter said that this difference would create additional work for State DOTs and suggested one consistent reporting date, or that FHWA provide flexibility to align the Federal fiscal year or calendar year reporting dates. The Portland Metropolitan Area MPO and the Denver Regional Council of Governments commented that Federal fiscal year or calendar year reporting dates for different measures are inconsistent and confusing. On the other hand, State DOTs of Washington State, Connecticut, and Oregon, AASHTO, and Puget Sound Regional Council MPO supported the metric data requirements for CMAQ on-road mobile source emissions measures based on Federal fiscal year and all travel time related measures based on calendar years. The Puget Sound Regional Council added that utilizing the existing reporting framework for CMAQ projects simplifies the process for MPOs.

In the NPRM, FHWA stated that the CMAQ on-road mobile source emissions measure establishment would rely on the existing processes State DOTs use to manage, track, and report projects as part of the CMAQ program. For this reason, FHWA elected to base the performance period for the on-road mobile source emissions measure on the Federal fiscal year to align with Federal fiscal year based reporting of the estimated emission reductions by State DOTs for CMAQ-funded projects through the CMAQ Public Access System. The FHWA believes that this approach provides the simplest and most effective means to implement the MAP-21 performance requirements for on-road mobile source emissions. As for all other measures (including the CMAQ traffic condition measures), calendar year-based data collection and reporting requirements specified in subparts E, F, and G are aligned with Calendar Year-based performance period. For these reasons, FHWA retains the language in section 490.105(e)(4)(i) unchanged. Although the performance period for the on-road mobile source emissions measure is different from all other measures, the reporting dates for condition/performance, targets, progress, etc. required in section 490.107 for the on-road mobile source emissions measure are the same as all other measures in this rule.

21. Boundaries

The Denver Regional Council of Governments commented that the geographic area application for each measure is confusing (urbanized area vs. transportation management area vs.

metropolitan planning area) particularly in light of DOT’s NPRM on “MPO Coordination.”¹⁵ The Connecticut and Arkansas DOTs commented that a greater consistency in boundaries is needed throughout this rule. The Arkansas DOT recommended a simpler, consistent boundary source be adopted in conjunction with State DOTs and MPOs, particularly given the uncertainty surrounding the definition of Metropolitan Planning Area in the context of the Metropolitan Planning Organization Coordination NPRM. The DOTs of Connecticut, Arkansas, and Maryland and AASHTO stated that, “the urbanized area geography is not well understood and the specific use of it in calculating the congestion metric involves a significant learning curve that will take time to better understand.” The National Capital Region Planning Commission stated that the urbanized area boundary determination process of the Census Bureau is not well understood and importantly does not appear to be based on transportation and mobility considerations within the urbanized area. The commenter added that the Census urbanized area does not align with jurisdictional boundaries, which in most places is where preliminary transportation project planning and programming decisions are made. Finally, this commenter said that the basic unit used for developing urbanized areas, census blocks, differs from the basic unit used by MPOs, Transportation Analysis Zones.

The NJTPA requested a clarification on the treatment of segments that cross MPO and/or urbanized area boundaries. The commenter said that the proposed rule is unclear as to how reporting segments that cross MPO and/or urbanized area boundaries are to be handled. Moreover, the commenter said that none of the measures that MPOs need to report at the MPO level mention how to handle reporting segments that cross an MPO boundary.

The FHWA clarifies that only the CMAQ traffic congestion measures in subpart G are applied to applicable¹⁶ urbanized areas for State DOTs and MPOs. All measures in other subparts in this rule are applied to State geographic

¹⁵ NPRM on “Metropolitan Planning Organization Coordination and Planning Area Reform”, 81 FR 41473 (June 27, 2016).

¹⁶ Urbanized areas with a population over one million for the first performance period and over 200,000 for the second and all other performance periods, that are, in all or part, designated as nonattainment or maintenance areas for ozone (O₃), carbon monoxide (CO), or particulate matter (PM₁₀ and PM_{2.5}) National Ambient Air Quality Standards (NAAQS) discussed in more detail under Section V Subpart G.

boundaries for State DOTs and metropolitan planning area boundaries for MPOs. The FHWA made the exceptions for traffic congestion measures because traffic congestion is more relevant in urbanized areas. Because the State geographic boundaries and the metropolitan planning area boundaries may include both urban and rural areas (and in different proportions), FHWA believes that the varying proportions of rural area (or road network in rural areas) would impact the statewide or metropolitan planning area -wide measures differently across the States and metropolitan planning areas.

As a result, FHWA is applying the CMAQ traffic congestion measures to the areas selected based on uniform and consistent criteria, such as the U.S. Census Bureau in designating urbanized areas. The FHWA understands that urbanized areas may not be the unit of area for transportation project planning and programming decisions for some agencies. However, focusing on traffic congestion in urbanized areas will allow for the opportunity to significantly reduce traffic congestion on the NHS across the nation while reducing the burden for the State DOTs and MPOs to implement the traffic congestion measures in non-urbanized areas. The FHWA disagrees with the comments from DOTs of Connecticut, Arkansas, and Maryland and AASHTO stating that “the urbanized area geography is not well understood.” The FHWA believes that State DOTs are well aware of a need for consistency or geographic continuity in urbanized area boundaries for transportation planning purposes through FHWA issued guidance.¹⁷ The FHWA believes that State DOTs’ detailed understanding of urbanized areas in planning is exhibited through State DOT reported data to HPMS.¹⁸ For this reason, FHWA retains sections 490.105(d)(2) and 490.703 for the urbanized areas as the scope of traffic congestion measures and their performance targets.

22. Unified Targets

The AMPO commented that coordination across MPO boundaries is an important facet of the MPO planning process, but it is unclear that requiring single values and targets for entire (large) urbanized areas adds value. The commenter added that the proposed

unified target for an urbanized area adds significantly to the reporting complexity and may confuse interpretation of results. The AMPO and Kentucky DOT expressed concern that State DOTs and MPOs may be reluctant to adopt targets for areas outside of their control. The Oregon, Washington State, and Delaware DOTs expressed concerns about potential “time-intensive coordination requirements” and the complexity of multi-agency coordination associated with establishing a unified urbanized target, a concern echoed by the Connecticut DOT and the DVRPC. The Chicago Metropolitan Agency for Planning (CMAP) commented that, “it is an inappropriate enlargement of the Federal role to require the establishment of identical performance targets in separate States . . . nor is the mechanism by which the States would coordinate to establish identical targets explained in the NPRM.” The commenter added that the regulation would lead to a lowest common denominator approach to target setting. Other commenters agreed that the NPRM did not address how to resolve differences in target setting.

The Mid-America Regional Council suggested that FHWA give this particular issue additional consideration to determine how to best facilitate agreement between parties where such agreement is required and integrate this thinking into the final rule. Several commenters recommended that measure applicability be limited to “Metropolitan Planning Organization boundaries, or limit the reporting areas and targets to urbanized areas that fall within an MPO and/or a State.”

The FHWA believes that closer coordination among all entities in an urbanized area is necessary because traffic congestion within each entity’s geographic boundary urbanized area impacts the performance of the surrounding entities. A single, unified urbanized area target will foster a shared vision among State DOTs and MPOs of expectations for future condition/performance of the entire urbanized area and will ensure a jointly-owned target establishment process. More importantly, because the driving public does not concern itself with State or metropolitan planning area boundaries when it comes to traffic congestion, unified targets are crucial to communicate regarding traffic congestion for the entire urbanized area. The FHWA disagrees with CMAP’s comment that this requirement is “an inappropriate enlargement of the Federal role.” A single, unified urbanized area target aligns with 23

U.S.C. 134(h)(2)(B)(i)(II) and 23 U.S.C. 135(d)(2)(B)(i)(II), which require State DOTs and MPOs to coordinate in establishing consistent targets, to the maximum extent practicable.

Because of the reasons above, FHWA retains the language proposed in NPRM § 490.105(d)(2), (e)(8)(iii)(B), and (f)(5)(iii)(B). The FHWA recognizes that State DOTs and MPOs will need more time to coordinate in the target establishment process, so FHWA provides a phase-in of this requirement in § 490.105(e)(8)(vi) and (f)(5)(vi), in the final rule, for the PHED measure in section 490.707(a).

23. CMAQ Measure Applicability

The Florida Metropolitan Planning Advisory Council commented that those States in attainment need to remain exempt from traffic congestion measures and targets. The NJTPA commented that the traffic congestion measure applicability determination approach described in § 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii) may cause problems for a State DOT or MPO with a small amount of urbanized area NHS roadways within their boundaries. The commenter recommended that FHWA consider a minimum length of urbanized area NHS roadway for the measure applicability.

The FHWA has emphasized a need for close coordination among all entities in an urbanized area because the traffic congestion within each entity’s geographic urbanized area boundary impacts the performance of the surrounding entities in that urbanized area. The absence of any one of the surrounding entities in implementing traffic congestion measures will hinder establishing an effective and meaningful performance target for that urbanized area. For this reason, FHWA retains the language, as proposed in the NPRM, on the criteria for State DOT traffic congestion measure applicability in § 490.105(e)(8)(i) and (ii).

The FHWA concluded that regardless of the NHS miles within an entity’s geographic urbanized area boundary, the traffic congestion on those miles of NHS could impact the traffic congestion in the broader area. The FHWA considered a minimum length of NHS within an entity’s geographic urbanized area boundary as a threshold in the applicability determination, but concluded that such an approach would be arbitrary. The FHWA thus retains the methodology and approach proposed in the NPRM for the traffic congestion measure applicability determination described in § 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii).

¹⁷ Highway Functional Classification Concepts, Criteria and Procedures (FHWA): https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section06.cfm.

¹⁸ “Urban Code” Data Item in HPMS sections data.

Commenters also requested flexibility to revise applicability if nonattainment or maintenance designations change during the 4-year performance period. The Georgia DOT recommended making the determination of which State DOT and MPOs are subject to CMAQ measures 1 year in advance of the State DOT Baseline Performance Period Report to provide some assurance and to avoid unnecessary resource expenditure based on assumptions.

The FHWA agrees with the comment from Georgia DOT that applicability determination should be made earlier. The FHWA revises in the final rule¹⁹ the timing of determining which State DOTs and MPOs are required to implement CMAQ traffic congestion measures in § 490.707(a) and (b) and CMAQ on-road mobile source emissions measure in section 490.807. The applicability determination for all CMAQ measures will be made 1 year before when the State DOT Baseline Performance Period Report.

The FHWA also agrees with the commenters on the flexibility to revise applicability if nonattainment or maintenance designations change during the 4-year performance period. As a result, FHWA has revised the rule to make section 490.809(c) inapplicable if U.S. Environmental Protection Agency changes to the designations become effective 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA. To be consistent with this change, FHWA revised § 490.105(e)(8)(iii)(F), (e)(8)(v), (f)(5)(iii)(F), and (f)(5)(v) for the traffic congestion measures, and § 490.105(e)(9)(v), (e)(9)(viii), and (f)(6)(v) for the on-road mobile source emissions measure.

24. Due Date for Initial Performance Reports

Many commenters explained that they would not have adequate time to complete a comprehensive Initial State Performance Report by the October 2016 deadline and urged FHWA to delay or change the due date.

The FHWA issued guidance²⁰ on the Initial State Performance Report on August 31, 2016, to provide State DOTs the opportunity to comply with the statutory deadline for the first performance reporting under 23 U.S.C. 150(e). In this guidance, FHWA

recognized that State DOTs would not have established targets for the measures in this rule. The FHWA simplified the reporting requirement by only requiring a description of the planned processes for target establishment and coordination with relevant MPOs and other agencies that will occur in the selection of targets. Therefore, FHWA removes the Initial State Performance Report requirement in this final rule.

25. MPO Reporting

The AASHTO and Connecticut DOT requested that individual MPOs submit their plans directly to FHWA, and the Denver Regional Council of Governments suggested that, “it may be simpler for State DOTs to compile one statewide version . . . with input from the State’s MPOs.”

The FHWA maintained that the MPO is responsible for creating the plan and submitting it to the State DOT in a timely manner. The rule does not require more than one State DOT to attach CMAQ Performance Plans for MPOs whose metropolitan planning area crosses a State boundary. The FHWA believes that this minimizes the reporting burden for both State DOTs and MPOs, since a State DOT simply needs to receive the plan from the MPO and attach it to its biennial report; the State DOT is not required to create or modify the plan. Adding a requirement for MPOs to report to FHWA would be more burdensome, as most MPOs do not currently report to FHWA; under the CMAQ program, State DOTs report on projects for MPOs. For these reasons, FHWA retained the requirement in section 490.107(c)(3) for MPOs to submit their CMAQ performance plans to FHWA through the State DOT.

26. Optional Target Reporting

The AASHTO and several State DOTs opposed to the requirement for State DOTs to report optional (additional—urbanized/non-urbanized area) targets to FHWA in FHWA-approved formats. They said that this requirement would force State DOTs to find a way to conduct additional planning without using words such as “target,” “measure,” or “performance management” to avoid FHWA’s reporting, recordkeeping, and other regulatory requirements. These commenters urged FHWA to remove the language requiring State DOTs to report boundaries, progress, etc. in section 490.105(e)(3).

The FHWA proposed that targets established pursuant to 23 U.S.C. 150(d)(2) (authorizing State DOTs to establish different performance targets

for urbanized and rural areas) be considered “optional” or voluntary targets for State DOTs. The proposal would allow State DOTs to establish a target for any combination of urbanized areas and provided that FHWA would not assess the progress achieved for any such additional or optional targets. The FHWA interprets 23 U.S.C. 150(e)(3) to require that State DOTs report the additional targets and their progress in achieving these targets in their Biennial Performance Reports. As a result, FHWA did not modify §§ 490.105(e)(3) and 490.107(b)(1)(ii)(A), (b)(2)(ii)(B), and (b)(3)(ii)(B).

27. Significant Progress Determination

The Oregon DOT suggested adding “planned transportation corridor improvements” to the list of extenuating circumstances for not achieving significant progress in section 490.109(e)(5)(i). Several commenters suggested that “insufficient funding” be added to the list. The Michigan DOT suggested adding the impact of economy on VMT because they said that transportation agencies have limited ability to influence the VMT changes due to economy on traffic congestion.

The FHWA understands that there are many external factors that could impact the condition/performance and the State DOT’s ability to make significant progress, including lack of funding. However, FHWA believes that the frequency of target establishment and State DOTs’ ability to adjust 4-year targets at the mid-point of a performance period creates a relatively short forecast window that should allow State DOTs to consider the impacts of funding shortfalls and uncertainty (e.g., lack of funding for investment, cost escalation) in initial targets and any subsequent adjustments. Additionally, State DOTs must consider uncertainties 2 years in advance in the State Biennial Performance Report. As discussed in section 490.105(e)(6), the actual duration that State DOTs have to consider uncertainties is shorter than 2 years.

The FHWA does not intend to use the significant progress determination process to be punitive or to encourage State DOTs to establish easy-to-achieve targets. Establishing targets and assessing progress is intended to encourage State DOTs and MPOs to establish data-supported targets that consider anticipated resources and potential uncertainties and to provide data-supported explanations of condition/performance changes. If a State DOT does not make significant progress because of lack of funding or other reasons, FHWA expects that State

¹⁹ Section 490.105(e)(8)(iii)(D) through (F), (e)(8)(iv), (f)(5)(iii)(D) through (F) and (f)(5)(iv) for traffic congestion measures and § 490.105(e)(9)(v) and (f)(5)(v) for on-road mobile source emissions measure.

²⁰ FHWA Guidance: Initial State Performance Report: <http://www.fhwa.dot.gov/tpm/guidance/160831.cfm>.

DOT will provide data-supported explanations for not achieving significant progress. Transportation performance management is not just about making significant progress. It is about effectively communicating to Congress and the public how the “planned transportation corridor improvements,” how the absence of “sufficient funding” and other circumstances are impacting the condition/performance of the transportation network. Moreover, FHWA believes the determination process must be meaningful and bring accountability to the program as MAP-21 and FAST Act intended. For these reasons, FHWA retains the language in section 490.105(e)(5)(i), as proposed in the NPRM.

C. Subpart E—National Performance Management Measures for the NHPP System Performance

1. Establishment of Greenhouse Gas (GHG) Emissions Measure

In the preamble to the NPRM, FHWA sought public comment on whether and how to establish a CO₂ emissions performance measure in the final rule. The FHWA asked a series of questions regarding the design and implementation of a GHG emissions measure and whether one should be established. The FHWA stated that if GHG emissions were to be measured, FHWA believed the best measure would be the total annual tons of CO₂ emissions from all on-road mobile sources. Finally, FHWA cited relevant research, including the FHWA publication, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, published in December 2013 (available in the docket for this rulemaking).

The FHWA received thousands of comments on whether or not to establish such a measure and how a measure should be designed and implemented. Supporting comments came from 91,695 citizens, 9 State DOTs, 24 MPOs, 19 U.S. Senators, 48 Members of the U.S. House of Representatives, over 100 cities, numerous local officials, over 100 businesses, and over 100 public interest, non-profit and advocacy organizations. Some State DOTs and MPOs already use GHG emissions as a performance measure.

Comments against a GHG emissions performance measure were submitted by 10 State DOTs, 2 MPOs, 5 U.S. Senators, 31 Members of the U.S. House of Representatives, and 27 transportation and infrastructure industry associations.

Additionally, nine State DOTs and three industry associations requested that FHWA not establish any performance measures not explicitly stated in legislation.

A number of the commenters in both groups addressed whether FHWA has the legal authority to establish a GHG measure and whether such measure could be established in this rulemaking.

After careful consideration of the comments received, FHWA decided to establish a GHG emissions performance measure in this rule to measure environmental performance in accordance with 23 U.S.C. 150(c)(3). Doing so will incorporate an important environmental aspect of system performance into the set of national performance measures, be responsive to public comments, improve transparency, and support the national transportation goal of environmental sustainability in the Federal-aid Highway Program and the national performance management program established in 23 U.S.C. 150. As highlighted in FHWA’s 2013 Conditions and Performance Report²¹ and its publication, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*,²² there are two main types of climate change risk affecting transportation infrastructure: Continued emissions of GHGs, such as CO₂, that adversely affect the atmosphere, leading to climate change effects, and threats to the transportation system posed by climate change impacts (e.g., damaged or flooded facilities).²³ In other words,

²¹ FHWA 2013 Conditions and Performance Report (PDF Version), “Advancing Environmental Sustainability” at 5–6 through 5–7. <https://www.fhwa.dot.gov/policy/2013cpr/pdfs.cfm>.

²² *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, FHWA (December 2013) at iii–iv. https://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/index.cfm.

²³ Extreme weather and other impacts related to GHG emissions, such as sea level rise, can harm, disrupt, and damage transportation systems, particularly through flooding, resulting in costly disruptions. For discussions of the potential disruptive effects of climate change on the transportation system, see also *Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: The Gulf Coast Phase 2, Task 3.2 Engineering Assessments of Climate Change Impacts and Adaptation Measures* (FHWA and U.S. DOT Climate Change Center) (August 2014) at 273 (available as of September 14, 2016, at http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/phase2_task3/task_3.2/task2phase3.pdf); and *Hampton Roads Climate Impact Quantification Initiative, Baseline Assessment of the Transportation Assets and Overview of Economic Analyses Useful in Quantifying Impacts*, U.S. DOT (September 13, 2016) (available as of November 1, 2016 at http://ntl.bts.gov/lib/60000/60100/60161/Hampton_Roads_Climate_Impact_Initiative.pdf).

the transportation system both contributes to climate change and suffers from the impacts of climate change (e.g., flooding, sea level rise). Reducing GHG emissions from the U.S. transportation sector will reduce the sector’s impact on climate change, promote environmental sustainability, and help to protect the NHS from damage caused by climate change.²⁴

The GHG performance measure established in this rule is the same measure discussed in the NPRM: Total annual tons of CO₂ emissions from all on-road mobile sources. The FHWA designed the measure in a manner that uses existing data sources and minimizes burden on transportation agencies. Because FHWA is establishing the measure under 23 U.S.C. 150(c)(3), it applies to the NHS in all States and metropolitan planning areas. State DOTs will calculate the measure by multiplying motor fuel sales volumes already reported to FHWA by FHWA-supplied emissions factors of CO₂ per gallon of fuel and percentage VMT on the NHS.

A discussion of legal comments received and a synopsis of the comments and responses on questions FHWA posed in the NPRM follow.

Legal Questions

Authority To Establish a GHG Measure

A number of commenters supported FHWA’s legal authority to adopt a GHG performance measure in this rulemaking. Commenters pointed to the language in 23 U.S.C. 150(a) as evidence that performance management is not limited to the performance measures listed in 23 U.S.C. 150(c), but rather is intended to focus on achieving the national goals in 23 U.S.C. 150(b). Commenters cited the national goal of environmental sustainability in 23 U.S.C. 150(b)(6) in supporting FHWA’s legal authority. That provision states “[i]t is in the interest of the United States to focus the Federal-aid highway program on the following national goals: * * * (6) Environmental sustainability.—To enhance the performance of the transportation system while protecting and enhancing the natural environment.” Several commenters stated a GHG performance measure is within the statutory authorization of MAP-21, including the performance measure provision for on-

²⁴ See, e.g., discussion in Section III(A) of CEQ’s *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (August 1, 2016). Available as of September 14, 2016, at <https://www.fhwa.dot.gov/map21/guidance/guidecmaq.cfm>.

road mobile source emissions under the CMAQ program (23 U.S.C. 150(c)(5)(B)). The commenters did not view the language as limited to the three pollutants specified in the CMAQ statute (*i.e.*, ozone, PM, and CO).

Some commenters pointed out that establishing a GHG performance measure would be consistent with other MAP-21 rulemakings. In particular, six members of the Senate Committee on Environment and Public Works pointed to the consistency between a GHG performance measure and provisions in FHWA's 23 U.S.C. 119(e) asset management rulemaking relating to current and future environmental conditions, including extreme weather events and climate change.

Commenters supporting FHWA's legal authority for a GHG performance measure also cited a number of provisions in title 23 of the United States Code as authority for the GHG measure. These included 23 U.S.C. 134(a)(1), 23 U.S.C. 134(c)(1), 23 U.S.C. 134(h), 23 U.S.C. 135(d)(1), and 23 U.S.C. 101(b)(3)(G).

Some commenters encouraged FHWA to interpret "air pollution" in 23 U.S.C. 134(a)(1) in a manner consistent with the definition of "air pollution" under the Clean Air Act,²⁵ which commenters felt would clearly bring GHG within the scope of 23 U.S.C. 134(a)(1) and under FHWA's authority. Commenters pointed to the CMAQ program as evidence of congressional intent to integrate the Clean Air Act into transportation planning. One commenter cited the Supreme Court decision in *Massachusetts v. EPA*, 547 U.S. 497, 528–29 (2007), for the principle that a GHG performance measure would not impermissibly conflict with the jurisdiction of other agencies, such as EPA.

One commenter stated that the authorizing language in 23 U.S.C. 150(c)(1) mandates that FHWA promulgate rules establishing performance measures and standards and in adopting that provision, Congress granted FHWA authority to promulgate rules establishing standards for performance management that apply to programs and objectives beyond those programs listed in 23 U.S.C. 150(c)(3)–(6). According to the commenter, the 23 U.S.C. 150(c)(2)(C) language limiting subsection 150(c) performance measures to those described in that subsection does not apply to performance standards adopted pursuant to the authorizing language in subsection 150(c)(1). The commenter concluded that 23 U.S.C. 150(c)(1) and 23 U.S.C.

135(d)(2) together give FHWA authority to establish standards for performance-based decisionmaking related to the national goals and planning objectives, including a GHG-related performance standard.

A number of commenters stated FHWA has no authority to adopt a GHG performance measure because they interpreted language in 23 U.S.C. 150(c)(2)(C) as barring the adoption of any measure not expressly listed in the statute. According to those commenters, the absence of a direct mention of GHG or climate change in the statute forecloses adoption of a GHG performance measure because 23 U.S.C. 150(c)(2)(C) states that in carrying out rulemaking for performance measures and standards, the Secretary shall limit performance measures "to those described in this subsection." One commenter also took the position a GHG performance measure would not be related to any of the measures expressly listed in 23 U.S.C. 150(c). One commenter stated that, because a GHG measure would not be among the types of measures allowed by 23 U.S.C. 150(c), and because there is no ambiguity in the statute, adoption of a GHG measure would violate the separation of powers doctrine in the U.S. Constitution.

Several commenters focused on the possibility of legal authority for promulgating a GHG performance measure stemming from the CMAQ provision in 23 U.S.C. 150(c)(5). Those commenters viewed the term "on-road mobile source emissions" in 23 U.S.C. 150(c)(5) as limited in scope to actions that further the purposes of the CMAQ statute, 23 U.S.C. 149. In their view, any performance measure under 23 U.S.C. 150(c)(5) would have to relate to one or more of the three pollutants listed in the CMAQ statute, 23 U.S.C. 149. Those commenters pointed out that none of the three listed pollutants is a GHG. A few pointed to an FHWA response in its recent final rule for metropolitan and statewide planning as being an admission no authority exists for a GHG measure, citing 81 FR 34050, 34077 (May 27, 2016).

Finally, some commenters suggested FHWA should not issue a GHG performance measure because other Federal offices and agencies have authority over such emissions and already are taking action in this area. They pointed to regulations adopted by the National Highway Traffic Safety Administration and EPA, as well as the recent issuance by the President's Council on Environmental Quality (CEQ) of National Environmental Policy

Act (NEPA) guidance on addressing GHGs.²⁶

In response to the comments on FHWA's legal authority for a GHG performance measure, FHWA first acknowledges the concerns and views expressed by commenters on both sides of the question. Commenters' responses to the NPRM's request for comments on a GHG measure provided important information for FHWA to consider when developing the final rule. After reviewing and fully evaluating all of the comments, FHWA confirmed that it has legal authority to adopt the GHG performance measure contained in this rule. The FHWA disagrees with commenters who stated there is no legal authority under 23 U.S.C. 150 for a GHG performance measure. In 23 U.S.C. 150(c)(3)–(6), the statute defines the general topics of statutory concern to be addressed by performance measures and the related program statutes (*e.g.*, condition of pavements on the Interstate and non-Interstate NHS for the purpose of carrying out 23 U.S.C. 119). While FHWA agrees performance measures adopted under 23 U.S.C. 150 must relate to the measures described in 23 U.S.C. 150(c), the statute gives FHWA the discretion to determine the nature and scope of specific performance measures that will fulfill the statutory mandates in 23 U.S.C. 150(c). Contrary to the interpretation of some commenters, FHWA's response in the final planning rule, stating 23 U.S.C. 150(c)(2)(C) "precludes FHWA from establishing any national performance measures *outside those areas identified in 23 U.S.C. 150*" (87 FR 34050, 34077) (emphasis added), conveyed this same point. Accordingly, in the three rulemakings to implement 23 U.S.C. 150, FHWA has adopted performance measures it determined were related to the 23 U.S.C. 150(c)(3)–(6) areas of concern and the cited program statutes. The FHWA has not adopted any performance measure that falls outside of those statutory parameters. The GHG performance measure established in this rule is no exception.

The FHWA is adopting the GHG performance measure under 23 U.S.C. 150(c)(3), which calls for performance measures that the States can use to assess performance of the Interstate and non-Interstate NHS for the purpose of carrying out 23 U.S.C. 119. 23 U.S.C. 150(c)(3)(A)(ii)(IV)–(V). Section

²⁶ *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Review*, CEQ (August 1, 2016). Available as of September 14, 2016 at <https://www.fhwa.dot.gov/map21/guidance/guidecmaq.cfm>.

²⁵ 42 U.S.C. 7602(g).

150(c)(3) does not impose any limitation on what type of NHS performance may be measured in rules promulgated under 23 U.S.C. 150(c)(3)(A)(ii)(IV)–(V). Consistent with its long-standing practice, FHWA interprets “performance” of the Interstate and non-Interstate NHS in those provisions to include environmental performance. This interpretation is supported by the many title 23 provisions that make the environment an integral part of the Federal-aid Highway Program, such as the national goal of environmental sustainability in 23 U.S.C. 150(b)(6), transportation planning provisions in 23 U.S.C. 134–135, and environmental provisions in 23 U.S.C. 109(c)(g),(h),(i), and (j).²⁷ The FHWA interpretation also is supported by the many FHWA actions to treat the environment, and specifically sustainability and climate change, as part of system performance. Examples include:

- The FHWA Strategic Plan, which embodies this view in its national system performance strategic goal: “The Nation’s Highway system provides safe, reliable, effective and sustainable mobility for all users.”²⁸
- The FHWA 2013 Conditions and Performance Report, which noted the transportation system is best able to reach peak performance when it can support economic competitiveness by providing adequate capacity and reliability while meeting sustainability goals.²⁹ For those reasons, FHWA stated, transportation agencies are being held accountable for how well they address these issues along with safety and state of good repair. The Report discussed the need to address climate change as part of promoting sustainability. The report described sustainability as requiring action to address climate change effects both through the reduction of GHG emissions and by ensuring the transportation system can adapt to future conditions caused by climate change.³⁰
- FHWA’s July 2013 guidance, *Handbook for Estimating Transportation Greenhouse*

²⁷ In addition, a number of statutes outside title 23, such as NEPA (42 U.S.C. 4321 *et seq.*), require consideration of the environment as part of developing and implementing infrastructure projects.

²⁸ FHWA Strategic Plan (2008–2016). The FHWA first adopted the plan in 2008 (available as of September 14, 2016 at <http://www.fhwa.dot.gov/strategicplan.pdf>). Since then, FHWA has updated the plan periodically, but the strategic goals and objectives have not changed. The FHWA did remove the sections outlining national strategies for achieving the agency’s strategic goals. This was done because the national strategies may change from year-to-year. The current version of the FHWA Strategic Plan (2016) is available at <http://www.fhwa.dot.gov/policy/fhplan.cfm> (as of September 14, 2016).

²⁹ FHWA 2013 Conditions and Performance Report (PDF Version) at 5–2. Available as of September 14, 2016, at <https://www.fhwa.dot.gov/policy/2013cpr/>.

³⁰ *Id.* at 5–6 through 5–7.

*Gases for Integration into the Planning Process.*³¹

- FHWA’s December 2013 guidance, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning.*³²
- FHWA Order 5520, *Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Effects* (December 15, 2014),³³ which states climate change and extreme weather events are a significant and increasing risk to the safety, reliability, effectiveness, and sustainability of transportation infrastructure and operations. The Order points to the costly and sometimes recurring damage to infrastructure from such climate change effects as sea level rise, resulting in a need to address potential effects of climate change in order to protect the integrity of the transportation system and to ensure the sound investment of taxpayer dollars.³⁴
- The Long Term Bridge Performance Program (enacted under SAFETEA–LU, Pub. L. 109–59, 119 Stat. 1144 (August 10, 2005)). The program defines bridge performance, in part, as a multifaceted issue that involves multiple components and depends on multiple factors, including varying conditions of climate, air quality, and soil properties.³⁵
- The FHWA guidance on environmental performance in infrastructure development, construction, and maintenance.³⁶

Thus, as described in the NPRM for this rulemaking, FHWA already has taken steps to “integrate climate analysis into the transportation planning process” and to “encourage[] transportation agencies to consider GHG

³¹ Available as of September 14, 2016, at http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_handbook/ghghandbook.pdf.

³² Available as of September 14, 2016, at http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/ghg_planning.pdf.

³³ Available as of September 14, 2016, at <http://www.fhwa.dot.gov/legregs/directives/orders/5520.cfm>.

³⁴ See Section 3 of FHWA Order 5520 (December 15, 2014).

³⁵ See Long-Term Bridge Performance Program Web site (available as of September 14, 2016, at <https://www.fhwa.dot.gov/research/tfhrcc/programs/infrastructure/structures/tlbp/about.cfm>).

³⁶ See, e.g., “Improving Environmental Performance in Construction and Maintenance, FHWA Successes in Stewardship Newsletter (March 2005, available as of September 14, 2016, at <https://www.environment.fhwa.dot.gov/strmlng/newsletters/mar05nl.asp>); “Highways in the Coastal Environmental: Assessing Extreme Federal Highway Administration, Hydraulic Engineering”, FHWA Hydraulic Engineering Circular No. 1 25–Vol. 2, Publication No. FHWA–NHI–14 (October 2014, available as of September 14, 2016, at <http://www.fhwa.dot.gov/engineering/hydraulics/pubs/nhi14006/nhi14006.pdf>); “Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects”, FHWA Environmental Review Toolkit (available as of September 14, 2016, at https://www.environment.fhwa.dot.gov/ecological/eco_5.asp); Office of Infrastructure Research and Development Web page (available as of September 14, 2016, at <https://www.fhwa.dot.gov/research/tfhrcc/offices/infrastructure/>).

emissions as part of their performance-based decisionmaking . . .” 81 FR at 23830.

Additional statutory support for a GHG measure may be found in 23 U.S.C. 119, which is the program statute referenced in 23 U.S.C. 150(c)(3). Section 119, enacted by MAP–21, sets forth the purposes of the NHPP, eligibilities for NHPP funding, purposes and requirements for State performance management (including asset management, significant progress and reporting requirements for performance measures), Interstate and bridge condition penalty provisions for falling below minimum conditions established by the Secretary, and environmental mitigation. Under the statute, the purposes of the NHPP include “to provide support for the condition and performance of the [NHS].” 23 U.S.C. 119(b). The performance management provisions in 23 U.S.C. 119(e) call for a performance-driven asset management plan that would “support progress toward the achievement of the national goals identified in section 150(b).” The national goals in 23 U.S.C. 150(b) include environmental sustainability. The environmental sustainability goal is to be achieved by “enhancing the performance of the transportation system while protecting and enhancing the natural environment.” 23 U.S.C. 150(b)(6). By incorporating the environmental sustainability goal into 23 U.S.C. 119, the statute affirms environmental sustainability as part of the performance of the NHS addressed by 23 U.S.C. 150(c)(3). Measures for assessing the performance of the NHS for the purpose of carrying out 23 U.S.C. 119 may include measures furthering the environmental sustainability national goal. The GHG performance measure falls within these parameters.³⁷

The FHWA agrees with commenters who cited several provisions in title 23 (23 U.S.C. 101(b)(3)(G), 134(a)(1), 134(c)(1), 134(h), 135(d)(1), and 135(d)(2)) in support of FHWA’s authority to address GHG emissions in this rulemaking. Those provisions identify interrelationships among, and in some cases call for action related to, environment, energy conservation, infrastructure performance, resiliency, and performance-based decisionmaking:

³⁷ Another national goal is congestion reduction (23 U.S.C. 150(b)(3)). In some cases, reduction in GHGs and congestion reduction are linked. For a discussion of the relationship between GHG emissions and congestion, see *Transportation’s Role in Reducing U.S. Greenhouse Gas Emissions, Volume 1, Synthesis Report*, USDOT Report to Congress (April 2010) (available as of September 14, 2016), at <http://www.reconnectingamerica.org/assets/Uploads/DOTClimateChangeReport-April2010-Volume1and2.pdf>.

- 23 U.S.C. 101(b)(3)(G) is a transportation policy declaration that “. . . transportation should play a significant role in promoting economic growth, improving the environment, and sustaining the quality of life . . .”.

- 23 U.S.C. 134(a)(1) is a congressional statement of transportation planning policy that it is in the national interest “. . . to encourage and promote the safe and efficient management, operation, and development of surface transportation systems . . . while minimizing transportation-related fuel consumption and air pollution through metropolitan and statewide transportation planning processes identified in this chapter . . .”.

- 23 U.S.C. 134(c)(1) requires metropolitan planning organizations to develop long range plans and transportation improvement programs to achieve the objectives in section 134(a)(1) through a performance-driven, outcome-based approach to planning.

- 23 U.S.C. 134(h) defines the scope of the metropolitan planning process. Paragraphs (h)(1)(E) and (I), respectively, require consideration of projects and strategies that will “. . . protect and enhance the environment, promote energy conservation, improve the quality of life . . .” and “. . . improve the resiliency and reliability of the transportation system . . .”.

- 23 U.S.C. 135(d)(1) defines the scope of the statewide planning process. Paragraphs (d)(1)(E) and (I) respectively, require consideration of projects, strategies, and services that will “. . . protect and enhance the environment, promote energy conservation, improve the quality of life . . .”, and “. . . improve the resiliency and reliability of the transportation system . . .”.

- 23 U.S.C. 135(d)(2) requires the statewide transportation planning process to “. . . provide for the establishment and use of a performance-based approach to transportation decisionmaking to support the national goals described in section 150(b) of this title . . .”.

In addition to the provisions listed above, the performance-based planning requirements in 23 U.S.C. 134(h)(2)(A) mirror the statewide provision in 23 U.S.C. 135(d)(2), stating the “. . . planning process shall provide for the establishment and use of a performance-based approach to transportation decisionmaking to support the national goals described in section 150(b) of this title . . .”.

Read together, these title 23 provisions make it clear that assessing infrastructure performance under 23 U.S.C. 150(c)(3) may properly encompass assessment of environmental performance, including GHG emissions and other climate-related matters. The fact that other Federal agencies have jurisdiction to act on those matters (in this case, climate change and GHGs) does not preclude FHWA from taking actions to help ensure the Federal-aid Highway Program fulfills its statutory objectives in title 23.

With respect to comments regarding FHWA’s authority to establish a GHG performance measure pursuant to 23 U.S.C. 150(c)(5) (CMAQ), FHWA agrees such authority exists, but FHWA has chosen to adopt the measure under 23 U.S.C. 150(c)(3) (NHPP) because it is more consistent with FHWA’s view that environmental performance is a key indicator of the success of the highway system, and because 23 U.S.C. 150(c)(3) permits the application of the measure to the entire NHS. The FHWA also agrees with commenters that FHWA has authority to establish performance standards pursuant to 23 U.S.C. 150(c)(1) and that the performance standard authority is not subject to the limiting language in 23 U.S.C. 150(c)(2)(C). However, this rulemaking is for performance measures, and FHWA does not believe it would be appropriate to use this rulemaking to establish a GHG emissions performance standard for States and MPOs.

Establishing a GHG Performance Measure in This Rulemaking

Several commenters argued that, should FHWA decide to establish a GHG performance measure, it should do so through a separate rulemaking. They claimed that the NPRM did not provide sufficient detail about the type of measure FHWA might adopt for them to comment on the issue meaningfully. The FHWA disagrees. The NPRM clearly signaled that FHWA was considering a GHG performance measure, pointed out the substantial body of research and guidance that FHWA and others have developed on ways to incorporate GHGs into performance-based transportation planning and programs, requested comment on a series of questions about whether and how to establish a GHG performance measure, and identified a preferred approach if a measure was to be adopted. The FHWA received many substantive comments in response to these questions, including from those who claimed the need for another round of rulemaking. These comments included numerous suggestions on how to structure (and not structure) a GHG measure. The FHWA relied on these comments to refine the measure included in the final rule. The CO₂ performance measure established in this rule is the same as that described in the NPRM and is consistent with elements recommended in several of the comments received. The detail and substance of information and suggestions received in response to the questions FHWA posed clearly show that interested parties were capable of providing, and in fact did provide,

informed comments regarding the establishment of a GHG performance measure.

Discussion of Comments Received in Response to NPRM Questions

a. Should FHWA include a measure that measures Greenhouse Gases (GHG)?

The FHWA’s decision to establish a GHG measure is responsive to three major categories of comments:

(1) Numerous commenters claimed that the set of performance measures proposed in the NPRM was too narrowly focused on the speed of vehicles moving through the system, to the detriment of other key aspects of system performance such as environmental performance, and the ability of people to reach a variety of destinations conveniently and affordably by multiple modes.³⁸ The FHWA agrees that as sound policy, the set of national performance measures must cover multiple key aspects of performance, otherwise decisionmaking may not properly take into account important aspects of performance. In response, this final rule includes measures on GHG emissions and modal share and consolidates NPRM measures stakeholders perceived as duplicative.

(2) Multiple commenters noted that a GHG measure would provide decisionmakers with better information about the transportation system’s GHG emissions and a means for measuring progress. The State DOTs from California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Vermont, Virginia, and Washington submitted a joint letter supporting the creation of a measure specific to GHG emissions from the transportation sector. The National Association for Clean Air Agencies noted that performance measures create transparency and help policy makers to determine how their goals are most likely to be achieved. The FHWA agrees with these comments.

(3) Numerous commenters³⁹ argued that a GHG measure should be implemented because policies to reduce GHG pollution from transportation are essential to minimize the impacts from climate change, which include sea level rise and increased frequency and

³⁸ See comments from New York State DOT, Nelson Nygaard, Sierra Club, Utah DOT, Association of Metropolitan Planning Organizations (AMPO), and the National Association of Regional Councils (NARC), as well as citizen letter campaigns sponsored by Transportation for America and Smart Growth America.

³⁹ See for instance comments from Center for Neighborhood Technology, Natural Resources Defense Council, U.S. Public Interest Research Group.

severity of heat waves and heavy downpours that threaten human health, agriculture, the economy, and transportation.⁴⁰ Reports from FHWA and the National Academy of Sciences detail negative impacts of climate change on the NHS.⁴¹

The FHWA agrees with these comments. Greenhouse gas emissions from the transportation sector recently surpassed those from electricity generation, making transportation the largest source of GHG emissions in the U.S.⁴² After decades of rapid increases, U.S. transportation carbon emissions are projected to remain relatively flat in the future, as future increases in freight and passenger travel are counterbalanced by stricter fuel economy standards for light-duty vehicles and new standards for medium- and heavy-duty vehicles.⁴³ Significantly greater reductions in transportation GHG emissions are needed to meet the near-term target of 26 to 28 percent below 2005 levels by 2025 and long-term trajectories of 80 percent or more by 2050 which would be consistent with the U.S. Midcentury Strategy for Deep Decarbonization and consistent with the long-term goals of the Paris Agreement.⁴⁴ Achieving CO₂

reductions of this magnitude will require actions such as reducing the growth in future travel activity and improving system efficiency, which are influenced by the planning activities and investment decisions of State DOTs and MPOs. A GHG measure emerged as a leading candidate for measuring the environmental aspect of the performance of the highway system during FHWA and stakeholder discussions in 2009.⁴⁵ Subsequently, FHWA initiated a research project to investigate GHG measures that would align with performance-based planning and programming, as well as how State DOTs and MPOs could go about implementing such a measure. A number of FHWA stakeholders served on the expert panel that provided input into the development of the resulting research report, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*.⁴⁶

The FHWA disagrees with commenters that argued that FHWA should not include a GHG measure because they felt that State DOTs and MPOs have insufficient ability to impact GHG emissions. State DOTs and MPO recipients of Federal transportation funds have control or influence over many strategies that impact transportation GHG emissions. These strategies can be divided into four major groups:⁴⁷

(1) *System efficiency.* These strategies optimize the operation, use, and maintenance of transportation networks, which in turn reduce GHG emissions per unit of travel. Relevant strategies include speed harmonization, speed limit reduction and enforcement, ramp metering, incident management, traveler information, traffic signal timing optimization, bottleneck relief, anti-idling ordinances, congestion pricing, and the improvement in freight intermodal connections.

(2) *Reducing the growth in VMT.* These strategies reduce the need to travel, increase vehicle occupancies,

and shift travel to more energy efficient options. Relevant strategies include integrated transportation and land use planning in coordination with local governments, public transportation and non-motorized transportation improvements and incentives, car sharing, employer-based strategies (such as telework), parking management and pricing, road pricing, and pay-as-you drive insurance.

(3) *Promoting alternative fuel vehicles.* State DOTs and MPOs can help plan for the siting and deployment of electric vehicle charging stations, designate and promote alternative fuel corridors, promote workplace charging initiatives, and promote adoption of alternative vehicles within agency and private fleets.

(4) *Increasing vehicle fuel efficiency.* State DOTs and MPOs can help bring to market higher efficiency vehicles and improve the performance of in-use vehicles. Relevant strategies include scrappage programs for low-mileage vehicles, feebates, heavy-duty vehicle retrofits, truck stop electrification, and eco-driver education and training.

The FHWA disagrees with the American Petroleum Institute, which suggested that FHWA should not include a performance measure on GHG because transportation GHG emissions are regulated by fuel economy standards. Continued growth in VMT is expected to counterbalance improvements in fuel economy, and as such, fuel economy standards alone are insufficient to reach GHG goals.

To allay some of the burden concerns raised by those arguing against a GHG emissions measure, FHWA has chosen a measure that relies on existing data and is straightforward to calculate. Limiting the measure to CO₂ simplifies calculations (since unlike the other GHGs, it is emitted in direct proportion to the amount of fuel burned), while still capturing 95 percent of transportation GHGs.⁴⁸ Limiting the measure to on-road emissions rather than full life cycle also simplifies analysis. The overall burden on State DOTs and MPOs is further reduced in the final rule by the elimination of the two NHPP peak hour performance measures and the truck congestion measure.

⁴⁰ United States Government, *National Climate Assessment*, 2014. <http://nca2014.globalchange.gov/>.

⁴¹ U.S. Department of Transportation, *Gulf Coast Study Phases I and II*, 2008 and 2015. http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/.

Federal Highway Administration, *Climate Resilience Pilot Program: Outcomes, Lessons Learned, and Recommendations*, 2016. http://www.fhwa.dot.gov/environment/climate_change/adaptation/resilience_pilots/2013-2015_pilots/final_report/.

The Transportation Research Board of the National Academy of Sciences, *The Potential Impacts of Climate Change on US Transportation*, 2008. <http://www.trb.org/Main/Blurbs/156825.aspx>.

Impacts include increases in flooding damaging roadways and disrupting travel, increases in heat waves degrading materials and impacting worker health and productivity, permafrost melt destabilizing roadways, changes in precipitation patterns leading to more landslides, drought conditions causing soil shrinkage and pavement cracking, as well as increased susceptibility to wildfires, causing road closures. Climate change increases the frequency and/or intensity of many extreme weather events that damage or disrupt transportation. Scenarios with lower greenhouse gas emissions in the future show lower negative impacts on the transportation system.

⁴² U.S. Department of Energy, Energy Information Agency (EIA), <http://www.eia.gov/totalenergy/data/monthly/>.

⁴³ U.S. Department of Energy, Energy Information Agency (EIA), *Annual Energy Outlook*, 2016. http://www.eia.gov/forecasts/aeo/tables_ref.cfm.

⁴⁴ U.S. Government, "Fact Sheet: U.S. Reports its 2025 Emissions Target to the UNFCCC," March 2015. <https://www.whitehouse.gov/the-press-office/2015/03/31/fact-sheet-us-reports-its-2025-emissions-target-unfccc>.

U.S. Government, "U.S. Mid-Century Strategy for Deep Decarbonization," November 4, 2016. <https://www.whitehouse.gov/the-press-office/2016/11/04/us-mid-century-strategy-for-deep-decarbonization>.

www.whitehouse.gov/sites/default/files/docs/mid_century_strategy_report-final.pdf.

⁴⁵ American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Performance Management (SCOPM), "Meeting Minutes," October 23, 2009. <http://scopm.transportation.org/Documents/Minutesof10.09SCOPMMeeting.doc>.

⁴⁶ FHWA, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, December 2013, Acknowledgements section of report front matter. http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/ghg_planning.pdf.

⁴⁷ U.S. Department of Transportation, *Report to Congress: Transportation's Role in Reducing U.S. Greenhouse Gas Emissions*, 2010.

⁴⁸ U.S. Department of Transportation, *Report to Congress: Transportation's Role in Reducing U.S. Greenhouse Gas Emissions*, 2010. The other greenhouse gases from transportation are hydrofluorocarbons (HFCs), methane (CH₄) and nitrous oxide (N₂O).

Should the measure address all on-road mobile sources or focus only on a particular vehicle type?

All of the commenters who responded to this question favored a measure that addressed all on-road mobile sources. The FHWA agrees. This approach allows for a more comprehensive picture of the transportation system's contribution to emissions, from passenger vehicles to freight movement.

b. Should the measure be normalized by changes in population, economic activity, or other factors (e.g., per capita or per unit of gross state product)?

Multiple commenters suggested that the measure examine both total emissions and be normalized by changes in population. Total emissions will need to be reduced to achieve GHG reduction goals; normalizing on a per capita basis acknowledges the fact that many States and regions are experiencing significant population growth. In addition to normalizing by population, the Texas DOT suggested normalizing by gross State product, port activity, State land mass, and consideration of the current built environment. Another commenter noted that a GHG performance measure indexed to gross State product or other economic indicators could rise or fall quickly based on economic trends that are difficult to predict, limiting its value in decisionmaking.

The FHWA decided a total on-road CO₂ measure (limited to travel on the NHS) is the best option. It makes assessment of progress toward performance management targets and national U.S. goals relatively easy. In contrast, CO₂ per capita could be decreasing while total on-road CO₂ is still increasing, failing to provide the total emissions data needed to understand and measure the performance goal of environmental sustainability.

The FHWA notes that State DOTs and MPOs have discretion to use additional performance measures and may wish to normalize CO₂ by total population as an additional useful indicator in their analyses. An FHWA research project identified light-duty vehicle CO₂ emissions per capita as a helpful additional measure to combine with the total on-road emissions measure. The research project report also includes information on data sources and methodologies.⁴⁹

⁴⁹ FHWA, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, December 2013.

c. Should the measure be limited to emissions coming from the tailpipe, or should it consider emissions generated upstream in the life cycle of the vehicle operations (e.g., emissions from the extraction/refining of petroleum products and the emissions from power plants to provide power for electric vehicles)?

Some commenters, including most of the MPO and State DOT commenters, recommended that the measure focus solely on tailpipe emissions, noting that tailpipes are the largest source of transportation emissions. These commenters noted that upstream fuel cycle emissions are more difficult to calculate and are largely outside the control of the transportation agency.

Others, including the Center for Neighborhood Technology, Natural Resource Defense Council, the National Association for City Transportation Officials, and the New York City DOT recommended that the performance measure include emissions generated upstream.

Several commenters, including the Sabin Center for Climate Change Law and the CMAP, recommended an intermediate approach to account for the electricity used to power electric vehicles.

After considering these comments and balancing the factors, FHWA decided to limit the measure to on-road CO₂ emissions for reasons of focus and simplicity.

One difficulty with upstream emissions from petroleum extraction and refining is they vary by where and how the fuel is extracted. An option is to use the national average adjustment factor of 27 percent to account for the upstream fuel-cycle emissions.^{50 51 52} This methodology can be helpful for understanding transportation's overall contribution to GHG emissions, but does not add value as a measure of State or MPO performance. Adjustments based on the national average fail to provide the type of differentiated information needed to capture the outcomes of State and MPO actions. A measure focused on tailpipe emissions simplifies the calculations and provides the type of specific information helpful to States and MPOs as they determine what measures to adopt to influence GHG outcomes.

The FHWA considered the comments supporting a measure that captures upstream emissions from electric cars,

⁵⁰ The U.S. EPA published estimates of fuel-cycle greenhouse gas emissions in "Greenhouse Gas Emissions from the U.S. Transportation Sector, 1990–2003." ⁵¹ The U.S. EPA calculated a national average adjustment factor of 1.27 (or 27 percent).

but declines to do so at this time because of the complexity it would add to the measure. Upstream emissions from electricity are more difficult to calculate because one must estimate the level of electricity consumed by electric vehicles. These data are not tracked separately and generally are estimated based on electric vehicle registration data. In addition, excluding upstream electricity emissions will preserve the rule's focus on on-road emissions. While FHWA has decided to exclude upstream emissions from the GHG measure in this rule, research indicates electric vehicles typically produce lower lifecycle GHG emissions than the average gasoline-based vehicle, even when using electricity from the highest carbon U.S. electricity grids.^{51 thnsp;52} Transportation agency actions to encourage electric vehicle use (such as deployment of charging infrastructure, preferred use of High Occupancy Vehicle/express lanes for electric vehicles, etc.) will result in reduced overall CO₂ emissions as well as reduced CO₂ emissions in the tailpipe measure.

State DOTs may voluntarily report additional measures of CO₂ performance, in addition to their baseline requirement. These additional measures, or variations, could include metrics for electric vehicle emissions, VMT-based estimates, and/or per capita emissions, among other options to test innovative reporting options. The FHWA's online reporting portal allows the State to attach supplemental information at their discretion.

d. Should the measure include non-road sources, such as construction and maintenance activities associated with Title 23 projects?

Several commenters, including the Georgia and Minnesota DOTs, Denver Regional Council of Governments, and the San Francisco Municipal Transportation Agency, recommended that the measure be limited to tailpipe emissions. These commenters said that tailpipe emissions make up the majority of transportation emissions and that construction and maintenance emissions are more difficult to calculate. Other commenters recommended that tracking emissions from construction and maintenance of highway projects is desirable, but that emissions from

⁵¹ Union of Concerned Scientists, *Cleaner Cars from Cradle to Grave*, 2015. http://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions#.V_Ug2E2V_ct.

⁵² Department of Energy, *Emissions from Hybrid and Plug-in Vehicles*, 2016. http://www.afdc.energy.gov/vehicles/electric_emissions.php.

facility use (*i.e.*, tailpipe emissions) warrant the largest share of attention and analysis.

The FHWA agrees with commenters that the measure should be limited to tailpipe emissions. Accordingly, construction and maintenance emissions are not included in the CO₂ emissions measure because of the complexity and burden it would add to the measure. The level of construction and maintenance emissions varies year to year based on project cycles. This means that grouping them with on-road vehicle emissions in a single performance measure would make it more difficult to analyze trends and ascertain progress. A separate measure for construction and maintenance CO₂ emissions may be helpful, but FHWA is not adopting such additional measure in this rulemaking. The FHWA wishes to limit the performance management burden on State DOTs and MPOs by, in part, limiting the number of performance measures adopted in this rulemaking.

However, FHWA encourages State DOTs and MPOs efforts to track and reduce construction and maintenance CO₂ emissions. One tool for this is FHWA's Infrastructure Carbon Estimator (ICE)⁵³ tool. These emissions can be included in other CO₂ emissions analyses that agencies may be conducting during the transportation planning process.

e. Should State-level CO₂ emissions be estimated based on gasoline and diesel fuel sales, system use (vehicle miles traveled [VMT]), or other surrogates?

Several commenters, including the DOTs of California, Colorado, Delaware, Virginia, Oregon, Pennsylvania, Vermont, Wisconsin, and Minnesota, recommended that, at least in the short term, the measure should use fuel sales data to calculate CO₂ emissions. They noted that CO₂ is emitted in direct proportion to the amount of fuel burned and that States already report fuel sales data to FHWA. However, commenters noted some disadvantages of using fuel sales data: It is not available at finer geographic scales, such as the metropolitan level, and there are boundary issues with fuel purchased in one State but combusted in another State or region.

Other commenters, including the Georgia DOT, Denver Regional Council of Governments, Southwest Energy Efficiency Project, and the Center for Neighborhood Technology,

recommended that the measure should use VMT as the basis for estimating CO₂ emissions. They stated that using VMT data from travel demand models combined with the EPA MOVES⁵⁴ model to estimate CO₂ emissions based on travel distances, speeds, and operating conditions provide an accurate picture of on-road CO₂ emissions in a State or region. In addition to calculating current emissions, this type of analysis is also helpful in understanding how State DOT and MPO investment decisions and policies, such as adding proposed new lane miles, can influence future CO₂ emissions by altering inputs to the travel demand model. The commenters acknowledged, however, that many State DOTs and MPOs lack the modeling expertise and quality data needed to use a method that relies on a travel demand model in combination with MOVES.

The FHWA decided that for calculating the CO₂ emissions performance measure, States will use a methodology that relies on fuel sales volumes. This method is simple, accurate, and relies on data that States already report to the agency. Commenters pointed out a fuel-based measure would have minimal implementation costs as compared to a VMT-based measure, which would require transportation agencies to dedicate staff to the effort and incur new ongoing costs.

Fuel-based methods typically rely on estimates of fuel sales and directly convert fuel use estimates into CO₂ emissions estimates based on the carbon content of each fuel. The basic equation for estimating CO₂ emissions using fuel sales is:

$$\text{Fuel Consumed} \times \text{CO}_2 \text{ emissions per unit of fuel} = \text{CO}_2 \text{ Emissions}$$

The CO₂ emissions factor depends on the fuel type (*e.g.*, motor gasoline, diesel).

The VMT-based methods rely on quantifying the amount of vehicle travel and then connecting this information to an estimate of CO₂ emissions using emission factors or an emissions model. The basic equation for estimating emissions using VMT is:

$$\text{VMT} \times \text{CO}_2 \text{ per VMT} = \text{CO}_2 \text{ Emissions}$$

However, to achieve an accurate picture and assess improvements, the process would have to use different emissions factors (typically presented in grams of CO₂ per mile) for different vehicle types,

classes within vehicle types, technology/fuels types, speeds, and operating conditions.

For the GHG performance measure, State DOTs must use the fuel sales methodology for calculating State on-road CO₂ on the NHS. However, in addition to the baseline requirement for State DOTs to report on-road CO₂ on the NHS using a fuel sales methodology, State DOTs may voluntarily report CO₂ emissions using alternative methods, such as VMT based methods. State DOTs would attach this as supplemental information in FHWA's online reporting portal.

For metropolitan planning areas, MPOs and State DOTs are granted flexibility in how they calculate the required CO₂ performance measure. The FHWA adopted these different approaches because of: (1) The lack of data available on fuels sales at the metropolitan planning area level and (2) the need to ensure one consistent method for State DOT measures in order to understand national performance trends and to allow for a consistent approach to progress determinations.

Methodologies available for calculating on-road NHS CO₂ emissions for metropolitan planning area include (in order of level of effort):

Fuel-based Methods:

If fuel sales volumes are available at the metropolitan planning area level, MPOs may use the same fuel-based method as outlined for the State DOTs (fuel volumes multiplied by emissions factors). The strengths of this method are that it is simple and consistent with the State method. There are limitations to this method. Fuel sales data are not usually available at the metropolitan planning area level. Also, fuel sales may not match well with actual travel activity in smaller geographic areas, as drivers may purchase fuel in one area and use it in another area. This is much more of a concern at the metropolitan planning area level than the State level since the metropolitan planning area is a smaller geographic unit.

Another option is for MPOs to allocate GHG emissions based on metropolitan planning area share of NHS VMT. This is done by multiplying the statewide NHS on-road CO₂ emissions by the percent of the State's NHS travel that occurs within the MPA. The strengths of this method are that it is simple, providing a rough estimate of the metropolitan planning area share of CO₂ emissions. However, this method does not account for differences between metropolitan areas and between metropolitan and rural areas in vehicle fleets, speeds, and operating

⁵³ FHWA, *Infrastructure Carbon Estimator*, http://www.fhwa.dot.gov/environment/climate_change/mitigation/tools/carbon_estimator/.

⁵⁴ The Motor Vehicle Emissions Simulator (MOVES) is EPA's official model for estimating emissions from cars, trucks and motorcycles. <http://www.epa.gov/otaq/models/moves/index.htm>.

conditions. It will not accurately capture some types of strategies that the MPO may use to reduce CO₂ emissions, such as traffic smoothing with roundabouts or advanced signal timing.

VMT-based Methods:

The MPOs may use VMT from HPMS and national average emissions factors per mile of travel. The strengths of this method are that it is simple and well-g geared toward areas without network travel models. In addition, FHWA will provide emissions look-up tables by types of facilities and speed ranges reflecting national averages. The main limitation is that it does not account for the range of factors that vary in different locations and impact fuel consumption per mile of travel (and consequently CO₂ emissions per mile of travel), such as vehicle fleet composition, and operating conditions.

The MPOs also may use VMT from travel demand models combined with MOVES.⁵⁵ The strengths of this method include that MPOs in air quality nonattainment and maintenance areas are already conducting this analysis and can include CO₂ emissions in the MOVES output without additional effort. It provides robust and granular information on emissions. In addition to estimating current emissions, it is also well suited to support target-setting and analyze impacts of different transportation investment strategies on future emissions. However, some travel demand models are not sensitive to some CO₂ emissions reduction strategies such as the implementation of intelligent transportation system (ITS) strategies and operational improvements, the provision of pedestrian and bicycling infrastructure, and mixed use development. For areas not already using MOVES, MPOs will need to assemble local data or rely on default data, (relying on default data reduces accuracy). Areas not already using MOVES will need to become familiar with how to use the tool. Information on MOVES training is available on EPA's MOVES Web page: <https://www.epa.gov/moves/moves-training-sessions>.

A third option is FHWA's Energy and Emissions Reduction Policy Analysis Tool (EERPAT). The EERPAT is an integrated modeling system designed specifically to evaluate strategies for reducing surface transportation GHG emissions. It uses emissions factors from MOVES. There are several strengths to this method. In addition to estimating current emissions, EERPAT is also well suited to target-setting and analyzing impacts of different transportation

investment strategies on future emissions. It is sensitive to a number of strategies that are difficult to analyze using travel demand models, such as mixed use development, car sharing and provision of non-motorized infrastructure. The EERPAT can evaluate future changes in land use and is sensitive to external changes in the price of fuel. It can incorporate changes in vehicle technology, including the rebound effect from lower per-mile travel costs. It can be used to assess the overlapping effects of strategies applied in combination. The limitations of this method include the large number of model inputs required, some of which may be difficult to obtain. The EERPAT does not include a detailed representation of the transportation network, and has limited sensitivity to the impact of additional roadway and transit capacity.

The FHWA's *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process* provides step-by-step instructions on how to use these methods, as well as information on strengths and limitations of each. If MPOs have the technical capacity to use MOVES or EERPAT, FHWA encourages them to do so since they are more accurate.

f. Due to the nature of CO₂ emissions (e.g., geographic scope and cumulative effects) and their relationship to climate change effects across all parts of the country, should the measure apply to all States and MPOs? Are there any criteria that would limit the applicability to only a portion of the States or MPOs?

Nearly all commenters agreed that if a GHG measure were established, it should apply nationwide to all State DOTs and MPOs since all GHG emissions have the same impact on climate no matter where they are generated. The Air Pollution Control Division of the Colorado Department of Public Health and Environment recommended measuring performance on a statewide basis, not locally or regionally. The California DOT recommended that the measure apply and be reported by all States and that MPOs be encouraged to participate in target-setting discussions. Similarly, the North Front Range MPO suggested that the role of MPOs be limited to participating with State DOTs in target setting and development of reduction strategies.

A building materials firm, CEMEX, suggested that efforts should focus on the roads with the most traffic and trucks, namely the NHS.

After considering the comments received, FHWA decided that the measure should apply to the NHS in all States and MPOs. The measure is limited to CO₂ emissions on the NHS since the measure is to assess the performance of the NHS, per 23 U.S.C. 150(c)(3)(A)(ii)(IV) and (V). Existing data do not differentiate the exact volumes of fuel burned on the NHS versus the volume of fuels burned on other roads. Therefore, States will use VMT data to calculate the portion of travel that occurs on the NHS versus other roads and use that proportion to estimate the proportion of CO₂ emissions on the NHS.⁵⁶ Table VM-3 Federal-Aid Highway Travel (Annual Vehicle-Miles), found in FHWA's *Highway Statistics*, supplies the needed VMT information.⁵⁷

g. Would a performance measure on CO₂ emissions help to improve transparency and to realign incentives such that State DOTs and MPOs are better positioned to meet national climate change goals?

Several commenters noted that a CO₂ performance measure would help transportation agencies examine trends and analyze the effectiveness of strategies in achieving their goals. They also noted that it would create transparency, allowing stakeholders and the public to see what goals are being set, how they are being pursued, and the results the measure produced. The State DOTs of California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Virginia, Vermont, and Washington recommended that FHWA work with States to develop a national climate change goal for transportation that aligns with the Paris Climate Change Agreement. These DOTs suggested that States should use a CO₂ performance measure to drive decisions that help to meet or exceed the national goals under that agreement.

The Georgia DOT noted that the performance measure's effect on transparency would depend on the transparency and complexity of the measure itself and the associated reporting requirements. A GHG measure could help align incentives with national climate change goals, but would be an additional factor to

⁵⁶ The FHWA recognizes that this is not a perfect proxy, as speeds, operating conditions, and vehicle types on the NHS differ from those on other roads and differ between States. However, in balancing the competing goals of simplicity and precision, FHWA believes that this approach provides actionable information that DOTs and MPOs can use in evaluating system performance and making decisions, without significantly increasing workloads.

⁵⁷ Available at <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>.

⁵⁵ Or EMFAC in California.

consider in the tradeoff analysis conducted under a performance-based planning and programming approach.

The FHWA agrees with these comments. The CO₂ performance measure adopted in this rule can serve to advance the environmental performance of the NHS as well as to drive decisions that contribute to national GHG reduction goals, such as those described in the President's Climate Action Plan.⁵⁸ The simplicity of the GHG performance measure and the reporting requirements will make it easier for States and MPOs to administer the measure and their targets, and to incorporate reduction strategies into their planning process and investment decisions.

The Texas DOT suggested that any GHG emission reduction that State DOTs or MPOs could achieve would be small compared to the overall level of emissions. The FHWA notes that climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. The totality of climate change impacts is not attributable to any single action, but is exacerbated by a series of actions, including actions taken under the Federal-aid Highway Program. Therefore, a statement that emissions from a proposed action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge⁵⁹ and is not an appropriate basis for deciding whether or to what extent to consider CO₂ emissions from transportation in the performance management framework.

Publicly-available FHWA reports provide detailed guidance on how State DOTs and MPOs can include GHG emissions measures in performance management and how to estimate emissions levels.⁶⁰

⁵⁸ Executive Office of the President, *The President's Climate Action Plan*, June 2013. <https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>.

⁵⁹ Council on Environmental Quality, *Final Guidance for Federal Department and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, 2016. https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf.

⁶⁰ FHWA, *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*, December 2013. Acknowledgements section of report front matter. http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_planning/ghg_planning.pdf.

FHWA, *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process*, 2013. http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/ghg_handbook/ghghandbook.pdf.

h. The target establishment framework proposed in this rulemaking requires that State DOTs and MPOs would establish 2 and 4 year targets that lead to longer term performance expectations documented in longer range plans. Is this framework appropriate for a CO₂ emissions measure?

Several commenters, including the California, Minnesota, and Washington DOTs, and the North Front Range MPO, recommended that the measure have 4- and 20-year targets. These commenters suggested that a 2-year target may be too short to demonstrate significant changes to statewide CO₂ emissions. They said that a 4-year, short-term target would align the CO₂ measure with other national system performance measures and the 20-year long-term CO₂ performance target would align with the long-range planning timeline.

Some commenters suggested targets align with other processes, such as the timing cycles for transportation improvement programs (TIPs) (4 years), long range transportation plans (20 years), and air quality conformity analyses.

The FHWA decided that making the CO₂ measure consistent with the other NHPP performance measures would ease and streamline implementation. Even though a 2-year target is a very short timeframe, it can indicate progress toward a longer term goal and can reflect short-term actions such as operational improvements. Consistent with the other performance measures, for the CO₂ measure, State DOTs must establish both 2- and 4-year targets. The MPOs are subject only to a 4-year target-setting requirement for CO₂ emissions and MPOs must either:

- Agree to plan and program projects so that the projects contribute toward the accomplishment of the relevant State DOT target for the performance measure; or
- Commit to a quantifiable 4-year target for the performance measure for their metropolitan planning area.

In making this decision, FHWA does not discount the role of statewide and metropolitan long range transportation plans in performance management. These long range plans (20 years or more) include long-term expectations for the performance measures. The longer-term performance expectations are particularly important for CO₂ emissions as many reduction strategies, such as integrated land use and transportation planning or provision of new public transit systems, take years to implement or show impacts.

The FHWA also notes that the planning regulations relate directly to the performance management

regulations. The long range (20-year) transportation plans must include the required performance measures and targets (including for CO₂) and a system performance report that evaluates the condition and performance of the transportation system with respect to the performance targets. The short term (4-year) programming STIPs and TIPs must include a discussion of the anticipated effect of the STIP and TIP toward achieving the performance targets in the long range transportation plans. And for MPOs, the TIP must be designed such that once implemented, it makes progress toward achieving the performance targets in the long range plan.

The relevant regulatory sections are:

- 23 CFR 450.216(f)(1) and (2) and 450.324(f)(3) and (4) require that the long-range statewide transportation plan and the metropolitan transportation plans include a description of the performance measures and performance targets used in assessing the performance of the transportation system and that they also include a system performance report evaluating the condition and performance of the transportation system with respect to the performance targets.

- 23 CFR 450.218(q) and 450.326(d) require that the STIP and TIP shall include, to the maximum extent practicable, a discussion of the anticipated effect of the STIP and the TIP toward achieving the performance targets in the long-range statewide transportation plan and the metropolitan transportation plans. Also, § 450.326(c) requires that the TIP shall be designed such that once implemented, it makes progress toward achieving the performance targets in the metropolitan transportation plan.

State DOTs and MPOs both have substantial flexibility in choosing targets. As with other performance targets for the performance management measures, targets are generally established based both on policy aspirations and on analysis indicating what is believed to be attainable. As such, when establishing their CO₂ emissions targets, State DOT and MPO considerations likely would include these three factors:

(1) Projections of business-as-usual future CO₂ emissions. The U.S. Department of Energy, Energy Information Agency (EIA) provides projections taking into account Federal fuel economy standards and current VMT projections. Some States have revenue forecasting models that project future fuel sales that can be used to project future emissions levels.

(2) Policy goals. Twenty States have State-specific GHG emission reduction targets from statewide climate action

plans and/or State legislation.⁶¹ The U.S. has committed to reduce GHG emissions 26 to 28 percent below 2005 levels by 2025 and 80 percent or more by 2050.⁶²

(3) Analysis of what is attainable. For the purposes of target-setting, analyses of the potential effectiveness of various strategies may vary in level of effort and technical capabilities required. Options for analysis include:

- Using published information on the approximate magnitude of emissions reduction that can be expected from different strategies. The FHWA's *Reference Sourcebook for Reducing GHG Emissions from Transportation Sources*⁶³ provides ranges of emission reductions as well as costs, barriers to implementation, example projects, and co-benefits.
- Using sketch planning or scenario planning tools.
- Using VMT from travel demand models and MOVES.
- Using EERPAT, FHWA's integrated modeling system designed specifically to evaluate strategies for reducing surface transportation GHG emissions.

Note that while the rule requires State DOTs to use the fuel sales-based method for calculating past year CO₂ for national consistency reasons, they may use any variety of analytical methods for target-establishment. In fact, while fuel-sales methods are simpler and more accurate for calculating past CO₂, VMT-based methods will generally be more helpful in projecting future emissions and analyzing reduction strategies. This is because VMT-based forecasting methods can model changes in transportation demand resulting from various strategies.

i. Should short term targets be a reflection of improvements from a baseline (e.g., percent reduction in CO₂ emissions) or an absolute value?

Many commenters recommended that targets be expressed as a percent change from a certain year. They indicated it may be difficult to grasp the meaning of an absolute number of metric tons of CO₂. In contrast, decisionmakers and the public can more easily interpret a percent change and understand how it relates to existing State, national, and international GHG goals. It is common practice to express GHG goals as a percent reduction. The State DOTs of

California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Virginia, Vermont, and Washington recommended expressing the targets as percent reduction below a 2005 reference year to be consistent with the U.S. GHG reduction goals established under the Paris Climate Change Agreement. The Atlanta Regional Council suggested that CO₂ targets be expressed as percent reductions below what would be achieved from fuel economy standards alone.

The FHWA decided that the measure will be expressed as a percent change from 2017 NHS on-road CO₂ levels. The FHWA agreed with commenters that a percent change provides more meaning and context to decisionmakers and the public than a certain number of metric tons of CO₂. The FHWA agreed with commenters that a 2005 baseline would be in line with national goals. However, the size of the NHS materially changed after 2005 due to reclassification of roadways under MAP-21. The changes to the NHS, which began in 2012 and have continued in some States, are expected to stabilize by 2017. Using the 2017 reference date avoids the type of significant data adjustment that would be needed if 2005 were used as the reference date. Using 2017 as the reference date for the GHG measure also makes the starting point for the GHG measure more compatible with the first baseline year used in other measures.

j. What data sources and tools are readily available or are needed to track and report CO₂ emissions from on-road sources? What tools are needed to help transportation agencies establish targets for a CO₂ emission measure?

Commenters noted several data sources and tools are readily available:

- Annual fuel sales volumes by State;
- EIA data on CO₂ emissions per gallon of fuel;
- VMT data in HPMS;
- CO₂ emissions per mile of travel based on vehicle type, speed, and operating conditions available in EPA MOVES model⁶⁴;
- Fleet composition from vehicle registration records; and
- Argonne National Laboratory's national Vision model and California's Vision model, which allow States to evaluate vehicle technology, fuel, and efficiency scenarios for meeting air quality and climate goals.

Commenters also noted that the following tools and resources would be helpful:

- Tools and procedures to estimate GHG emissions and establish targets that are aligned with existing tools States and MPOs use in the planning process.
- Tools pre-populated with emissions factors.

- Tools to determine CO₂ targets and understand the probable efficacy of potential emission reduction strategies.

- New air quality calculators that incorporate GHG emissions or revised existing calculators that include GHG emissions.

- Tools that would enable agencies to measure tailpipe CO₂ emissions based on system use, including:

- Enhanced travel demand models for areas not sufficiently covered by existing models and new models that show the synergistic relationship between transportation and land use.

- Assistance developing MOVES inputs and running MOVES.

- Estimates of "business as usual" emissions in target years.

The FHWA has developed a series of tools and resources to assist State DOTs and MPOs in developing and evaluating effective GHG emissions reduction strategies. More information is available at: www.fhwa.dot.gov/environment/climate_change/mitigation/. The FHWA will continue to update tools and provide technical assistance. To minimize workloads, FHWA will provide on its Web site the CO₂ per gallon of fuel for all of the common motor fuels. In addition, FHWA will provide look-up tables with national averages of grams of CO₂ per VMT for different speeds for the national average vehicle fleet.

The FHWA recognizes that the measure of CO₂ emissions chosen here—the percent change in tailpipe CO₂ emissions on the NHS compared to the Calendar Year 2017 level—is imperfect. Data is not available to directly measure this, so we have chosen to measure this indirectly by calculating fuel sales and multiplying the associated CO₂ emissions by the proportion of VMT that takes place on the NHS. This method results in a measure that is only partially affected by projects that reduce emissions on the NHS. For example, if there is a significant downturn in the economy and people choose to drive less, this would result in a reduction in the measure. If people choose to drive the same amount, but shift some of their driving to non-NHS roads, this would also result in a reduction in the measure. If gas prices fall temporarily and people drive more, this would result in an increase in the measure. In addition, the measure does not take account of upstream emissions, so if people shift to EVs, the higher upstream emissions associated with this would not be captured. For these reasons, FHWA will, in the future, re-evaluate this measure and consider whether data are available to more directly measure emissions effects of NHS projects

⁶¹ FHWA, *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process*, 2013.

⁶² U.S. Government, "Fact Sheet: U.S. Reports its 2025 Emissions Target to the UNFCCC," March 2015. <https://www.whitehouse.gov/the-press-office/2015/03/31/fact-sheet-us-reports-its-2025-emissions-target-unfccc>.

⁶³ Available at http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications/reference_sourcebook/index.cfm.

⁶⁴ Or EMFAC in California.

undertaken by States or MPOs. If more direct data sources are developed, FHWA may consider revising this measure.

k. How long would it take for transportation agencies to implement such a measure?

Several commenters, including the State DOTs of California, Colorado, Delaware, Minnesota, Oregon, Pennsylvania, Virginia, Vermont, and Washington, suggested that transportation agencies could implement a fuel-based GHG measure in 1 to 2 years and that a VMT-based measure would take 3 to 5 years.

The FHWA has chosen a fuel-based measure that can be implemented within the 1- to 2-year time frame cited by commenters. This is consistent with the timeframes established in this rule (first performance period starts on January 1, 2018, and targets are due in October 2018).

l. The FHWA Requests Data About the Potential Agency Implementation Costs and Public Benefits Associated With Establishing a CO₂ Emissions Measure

Some commenters noted that a fuel-based measure would have minimal implementation costs, but that a VMT-based measure would require transportation agencies to dedicate staff to the effort and incur new ongoing costs. Commenters noted that the benefits of the rule would depend on the ambition of State DOTs and MPOs in setting targets and implementing strategies.

The FHWA appreciates the responses submitted on this question and has considered these comments in preparing the rule. Please see the regulatory impact analysis for detailed information on economic costs.

2. Removal of Peak Hour Travel Time Reliability Measure

Several commenters expressed concern that the proposed measures based on vehicle travel times are redundant and overly burdensome. Some suggested reducing the number of measures that rely on travel time in order to reduce the burden on transportation agencies, arguing that having seven metrics based on travel time data is redundant and provides little additional benefit. There were commenters in favor of removing the LOTTR, PHTTR, TTTR, freight congestion, and Excessive Delay measures, respectively. Several commenters suggested replacing the PHTTR measure with the Excessive Delay measure and vice versa.

The measures proposed in the NPRM represented different aspects, but similar types, of performance. The FHWA based the proposed measures on the availability of existing data and feedback from stakeholder sessions early in the rulemaking process. After reviewing the comments, FHWA agreed that the number of measures should be reduced to minimize the burden to analyze data and establish targets and to simplify the method to determine metrics and measures. In this final rule, FHWA has reduced the number of measures that rely on travel time from seven to four. The four measures will be used to assess reliability (both for all vehicles and trucks) and delay experienced by all travelers during peak hours.

Commenters were most critical of the PHTTR measure. Many questioned the usefulness of this measure and raised concerns about the many aspects of the measure. Commenters also discussed the similarities between the PHTTR and Excessive Delay measures, which many felt created an unnecessary complication and added burden. In response to these comments, FHWA consolidated the proposed NHPP PHTTR measures and the CMAQ Excessive Delay measure into one measure under the CMAQ program: Peak Hour Excessive Delay (PHED). Discussion of these changes to the Excessive Delay measure can be found in the Response to Comments Section for subpart G. The rule now weights all but one of the four travel time derived measures (*i.e.*, truck reliability) to reflect the impact of performance on all travelers. Reducing the number of travel time derived measures will still allow for the assessment of reliability and congestion at the State, urbanized area, and national levels.

3. NHPP Reliability

a. Reliability—Use of Traffic Volumes Versus People Traveling

Many commenters supported using volume data to weight the LOTTR measure. The NACTO suggested modifying the LOTTR to include transit movement weighted by ridership. The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation suggested including hourly volumes (the same used for the proposed CMAQ Traffic Congestion delay measure) in the calculation for LOTTR. The NJTPA also suggested volumes for LOTTR modifications and proposed using occupancy estimates to weight by person volumes, not just vehicle volumes. Many commenters felt that the proposed measures were too

focused on vehicle delay and wrongly ignore person throughput. The Washington State House of Representatives commented that congestion should be measured on reliability, or whether or not a trip takes the same amount of time from day to day, rather than delay. Focusing on driver delays creates a one dimensional vision of congestion and ignores alternative modes of transportation that people use to travel through a corridor, and reliability would be a better measure to ensure that people can count on a consistent commute day to day, no matter what mode of transportation they use.

Commenters also stated that the NPRM required traffic volumes to be used in the calculation of the CMAQ Excessive Delay measure, but not the NHPP Reliability Measure. The NJTPA states the incorporation of person and goods volumes in the reliability and delay metrics would improve their perspective. The FHWA agrees with these comments and believes that the NHPP Reliability measures would be improved by weighting the metrics with volumes. This change will put a greater emphasis on roadway segments where reliability deficiencies are impacting the greatest number of people using the system. The final rule requires the measure to be weighted by annual traffic volumes, which puts the focus on the most heavily travelled roads.

In the NPRM, FHWA was concerned about the absence of data regarding actual traffic volumes for the level of roadway coverage and granularity needed (entire NHS and 5-minute temporal granularity). The FHWA believed including volume would require actual volume counts every 5 minutes for every NHS road segment, data which do not currently exist. In the final rule, FHWA has decided to use annual average daily traffic (AADT) to weight segments in the calculation of the measure, rather than use them in the metric calculation, the approach rejected in the NPRM. The FHWA maintained that the CMAQ Excessive Delay measure (new Peak Hour Excessive Delay), which applies to fewer entities, apply hourly traffic volumes for each segment.

To account for the movement of people rather than just vehicles in these measures, the measure will also be weighted by area wide/statewide occupancy factors. The FHWA will develop occupancy factors for both metropolitan and statewide areas based on national survey results, such as NHTS. Using both traffic volume and occupancy factors as weights in the calculation of the reliability measure

will allow the measure to reflect the percentage of all people experiencing reliable conditions. The measure will be more sensitive to congestion in areas where there are more person-miles traveled, which FHWA believes is an appropriate way to measure reliability for investment decisionmaking. In addition, in recognition of the evolving ability to accurately measure person throughput and the impact of multimodal travel, FHWA plans to revisit the measures related to reliability and congestion after Fall 2018 when FHWA's multimodal research study is expected to be completed.

b. Applicability of the Non-Interstate NHS NHPP Reliability Measure

The FHWA received several comments regarding the applicability of the NHPP non-Interstate NHS reliability measure, including restricting the measure to urbanized areas or to areas with populations of at least 1 million. These commenters argued that narrower applicability would reduce the cost and burden of data analysis on smaller, rural States.

The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation commented that FHWA should apply the travel time reliability measures to the entire NHS.

The FHWA acknowledges that rural roadways may only have limited reliability issues, but such problems can and do occur as a result of weather events, special events, tourist attractions, etc. The FHWA believes it is important to understand when and where reliability problems on both urban and rural segments of the non-Interstate NHS occur. The FHWA analyzed the burden on State DOTs and MPOs with rural and urban NHS networks and found that the level of change needed to justify the cost of compliance is achievable. The FHWA is committed to provide technical assistance and support to State DOTs. In addition, FHWA is interested in working with State DOTs and MPOs to lead a pooled fund effort to acquire resources to provide services and tools to minimize the resource demands to process and analyze data.

c. Excluding Weekends From LOTTR Calculations

Several commenters questioned the inclusion or exclusion of weekends in the LOTTR measure, arguing that exclusion of certain days should be consistent across all travel time-based measures. The Delaware DOT commented that in resort areas, Fridays should be considered weekends and

should not be included in LOTTR calculations.

The FHWA evaluated the impact of including weekends in the calculation of the reliability metric, finding that for Interstate roadways, the maximum LOTTR value typically occurred during the weekday or was similar during both weekdays and weekends. However, for non-Interstate NHS roadways, including weekend travel times resulted in reliability measures that were 5 percent to 7 percent worse than measures derived solely from weekday travel times. These data indicate that weekend travel impacts reliability for a sufficient portion of the system to warrant the inclusion of weekends in the metric calculation. System performance should be assessed during times of most use of the NHS system, which in many cases includes the weekend daytime periods. In many urban areas and areas with special events, there can be reliability issues even on the weekends. Including weekends will allow DOTs and MPOs to more fully monitor segments with reliability issues and monitor how they change year-to-year.

d. Time Periods for LOTTR Calculation

The FHWA received eight comments on the use of shorter time periods for the LOTTR calculation (e.g., individual hours rather than 6 a.m. to 10 a.m.). The AASHTO and others noted that the time period proposed in the NPRM highlights inconsistency in travel times within the time period bins rather than from day to day. This methodology could lead to segments reported as unreliable according to the LOTTR measure, while they may be considered reliable when using trip based reliability. The NYSAMPO noted that the longer peak periods mask the occurrence of reliability problems. The New Jersey DOT and NJTPA stated that the large time periods for analysis would be appropriate if people could shift their commute times within the period, but since most people cannot, the time periods are too long. The Southeast Michigan Council of Governments requested flexibility to report the highest values for each individual hour within the peak periods rather than a ratio accounting for all 4 hours. The Oregon Metro Council proposed a formula-based method to determine each agency's time periods to avoid mixing peak and off-peak travel time observations in the denominators of key metrics, which would obscure cross-regional comparison.

The FHWA recognizes that there are many approaches to measuring reliability and related congestion measures. The FHWA carried out a

number of analysis runs using travel time data for a mix of States and urbanized areas to evaluate the impact of reducing the number of time periods below the four that were proposed and shortening the duration of time periods to eliminate the "tails" where traffic tends to build up and reduce. The results from these runs showed that a sufficient number of roadway segments exhibited unreliable travel times during the midday and weekend time periods. In addition, FHWA found that shortening the time periods (to reduce "tails") resulted in similar outcomes as compared to the proposed time periods (less than 1 percent difference). The FHWA retained the four proposed time periods (AM peak, midday, PM peak, and weekend) and the duration of each time period. In this final rule, the 14 hours are broken down into four time periods: (1) Weekday mornings (6 a.m. to 10 a.m.); (2) weekday afternoons (4 p.m. to 8 p.m.); (3) midday (10 a.m. to 4 p.m.); and (4) weekends (6 a.m. to 8 p.m.). The FHWA believes that evaluating the hours when the system is most frequently in use, defined as 6 a.m. to 8 p.m. daily, is the best approach to assess reliability problems. The FHWA analyzed suggestions from commenters that showed there are reliability problems on certain sections of roadways during all of those time periods (with more occurring during peak periods). The FHWA also assessed if the longer time blocks (4 to 14 hours) proposed in the NPRM measured variability across the time period instead of variability from day-to-day at the time period throughout the year. Commenters were concerned that the variability in travel times at the "tails" of the longer time periods would control the reliability metric. The FHWA found no significant difference (results within 1 percent) between using the proposed time blocks to using 1-hour time blocks over the same time period (i.e., comparing one block of 6:00 a.m. to 10:00 a.m. to 4 time blocks each 1 hour in length from 6:00 a.m. to 10:00 a.m.). For this reason, FHWA decided to maintain the time blocks proposed in the NPRM in the final rule.

e. Use of 1.50 Threshold To Determine Reliable Segments

Several commenters expressed a desire to establish different thresholds for urban and rural roadways and based on segment length. These commenters explained that travelers tend to view the reliability of their travel based on a full trip and not the individual short segments that make up the trip. They suggested that the final rule include different thresholds for different TMC

lengths, since they could vary by more than 10 miles in length.

The NJTPA, TRANSCOM, AMPO and others expressed concern about the use of pass/fail threshold noting that incremental improvements in reliability would not be recognized until the LOTTR dropped below 1.50. These commenters argued that the use of a “sharp” cutoff threshold could bias investment decisions, encouraging State DOTs and MPOs to focus only on those segments that are close to the 1.50 threshold, even though optimal improvement may be on segments with much higher LOTTR values.

The FHWA appreciates and acknowledges these comments and considered alternative approaches to the proposed method. The FHWA ultimately elected to retain the approach to utilize a 1.50 threshold to reduce complexity in the calculation method. An alternative approach would have required varying threshold levels for different segments and the inclusion of more graduated levels of reliability, which FHWA felt would unnecessarily complicate the measure calculation and reporting process. The FHWA encourages State DOTs to discuss how investment strategies have resulted in incremental improvements to the reliability of the system in their Biennial Performance Report. In addition, FHWA has revised the Truck Reliability measure so that it is a weighted average of all segment level reliability ratios that will reflect all changes in reliability levels.

D. Subpart F—National Performance Management Measures for Freight Movement on the Interstate

1. Removal of Truck Congestion Measure

In the NPRM, FHWA proposed two measures of freight movement on the Interstate under 23 U.S.C. 150(c)(6): Truck Travel Time Reliability (TTTR) and Truck Congestion. Many commenters felt that the 50 mph speed threshold to define congestion for the Percent of the Interstate System Mileage Uncongested proposed in the NPRM is unreasonable and should be eliminated. Suggestions included:

- Making the threshold more flexible for each reporting entity
- Using some other variable such as population density
- Changing to a lower value such as 35 mph
- Changing to a percentage of the posted speed limit
- Making the threshold a function of population density, lanes, or ADT
- Rather than using thresholds, providing credit for incremental improvements.

The FHWA eliminated the performance measure for Percent of the Interstate System Mileage Uncongested; the TTTR Index is the only freight-specific performance measure adopted in this rule. The FHWA recognizes that the use of a single speed threshold as compared to an annual average of speed would not be an effective measure to assess uncongested conditions. Changing the measure to consider the factors expressed through comments would be complicated and overly burdensome to implement.

2. Consistency Between All-Vehicle and Freight Reliability Measures

Many commenters provided suggestions to better align the proposed reliability measure for the NHPP that reflects the travel of all vehicles and the proposed freight reliability measure that reflects the travel of trucks. The suggestions raised by commenters are discussed below and, in general, addressed a desire to: Remove the freight reliability measure, better align time periods with the two reliability measures, reconsider the longest travel time considered in the metric, and reconsider the threshold to define reliable travel time.

Many State DOTs and MPOs commented that all-vehicle and freight reliability measures should be consistent since trucks and cars are travelling on the same roads and improving reliability on a roadway benefits all vehicle types. Commenters noted that the NPRM uses data from the all vehicle travel time dataset to complete missing truck data in NPMRDS. Several State DOTs and MPOs also commented that separate measures created a perception that freight was being prioritized over passenger vehicles. Several commenters suggested that the proposed freight performance measures focus on peak period travel times or peak period congestion, with some suggesting focusing on corridors or bottlenecks and aggregating the data into 15-minute intervals and longer segments. If the intent is to show the off-peak freight flows, then FHWA should provide further guidance or focus the measure only on off-peak periods. If this is not the intent then there should not be two separate reliability measures. In addition, some commenters suggested that the measure evaluate peak seasonal performance rather than annual averages for freight facilities serving agricultural regions. Other commenters suggested that the final rule consider the use of peak periods and adding a fifth time period from 8 p.m.–6 a.m. daily. As with the LOTTR, commenters suggested

that the TTTR measure be computed separately for each single hour within the proposed time period and the measure should be the hour with the lowest percent reliable for the time period of interest.

The AASHTO and several State DOTs and MPOs commented that they do not agree with using the 95th percentile travel time for freight. Many questioned the justification for use of the 95th percentile, with some noting that it is too stringent. In response, some commenters, including AASHTO, AMPO, TRANSCOM, and several State DOTs suggested using the 80th percentile to be consistent with the LOTTR measure for all vehicles. The NARC and others suggested allowing State DOTs and MPOs flexibility to set the threshold. Other commenters did not specify the percentile, but requested that the percentile chosen be consistent with the all vehicles measure or that FHWA provide a rationale for why the thresholds are different. The AASHTO, along with Washington, Oregon, and Connecticut DOTs and Nebraska Department of Roads agreed with using the 50th percentile travel time as the normal truck travel time for the reliability measure. The FHWA considered commenters’ suggestions, and in particular, FHWA assessed the need for separate:

- Travel times—all vehicles and trucks;
- time periods—6 a.m. to 8 p.m. and 24 hours a day; and
- percentile to represent the longest travel times—80th, 95th, or other percentile.

In addition, FHWA considered the utility of using a 1.50 threshold as an indicator of reliable travel time performance, an issue that was raised for both freight and all vehicle measures.

As a result of this assessment, FHWA concluded that a separate reliability measure is needed to assess freight movement on the Interstate, but revised the measure to address comments about the 1.50 threshold and periods of analysis. A separate freight reliability measure will more accurately reflect the performance of the Interstate system as perceived by shippers and suppliers as the measure considers factors that are unique to this industry such as the use of the system during all hours of the day and the need to consider more extreme impacts to the system in planning for on-time arrivals. The FHWA believes that these changes simplify the calculation and addresses the concerns regarding the higher standard of performance proposed for truck reliability.

In addition to the data requirement changes discussed previously (*i.e.*, the use of 15 minute time periods and longer allowable segment lengths), FHWA simplified the truck reliability calculation by simplifying the method to utilize all-vehicle travel times when truck travel times are missing and using consistent time periods to those used for the all vehicle reliability measure. The FHWA retained the requirement to use truck travel times as the basis for the metric calculation to more accurately depict how freight is moving on the Interstate system as FHWA has consistently found the truck travel times to be slower than all vehicle travel times in the NPMRDS data set. The FHWA revised the truck reliability measure to use 5 time periods, 4 of which are used in the all vehicle reliability measure. These time periods cover 24-hours, broken into AM peak (6 a.m. to 10 a.m.), mid-day (10 a.m. to 4 p.m.), and PM peak (4 p.m. to 8 p.m.) periods for Mondays through Fridays, weekends (6 a.m. to 8 p.m.), and overnights for all days (8 p.m. to 6 a.m.). Aligning the time periods to the all vehicle time periods simplifies the analysis. Including all times recognizes the flow of freight during all hours of the day and also considers freight shippers that attempt to plan routes that optimize travel time and, when possible, attempt to avoid peak hours in major congested areas. The FHWA believes that the 5th time period is needed to consider travel times during overnight hours as shippers and suppliers rely on the system to support on time delivery needs 24-hours a day.

In response to comments, FHWA compared metric and measure results using the 80th percentile and the 95th percentile travel times. This analysis showed minimal differences in the reliability measure for the Interstate System using the 80th and 95th percentiles; however, metric results were considerably different at the roadway segment level. The FHWA believes that the 95th percentile travel time needs to be considered in the freight measure to account for the events that could impact on time delivery as shippers, carriers, and receivers desire on-time/just-in-time delivery of goods and plan their trips by building in enough time to meet delivery requirements. For these reasons, FHWA elected to maintain the 95th percentile in the truck reliability calculation.

The FHWA appreciates the concerns raised by commenters regarding the different standard used for freight and all vehicles measure and agree that, as proposed, this difference would put a priority on the freight metric in

decisionmaking. To address this concern, FHWA removed the 1.50 reliability threshold. As in the NPRM State DOTs will still report a reliability ratio (comparison of the 95th and 50th percentile travel times) for individual segments of roadway. However, as a result of the removal of the 1.50 threshold, FHWA will not assess if the roadway segment (as expressed by the reliability ratio) is providing for “reliable” travel times. The new measure is designed to use the reliability ratio of each segment, using the worst reliability ratio of all 5 time periods, to calculate an overall average truck reliability of the entire Interstate system. The Interstate system will be represented with one reliability ratio for trucks that will be used by State DOTs and MPOs to establish targets. State DOTs and MPOs will use the roadway segment level reliability ratios, considering the time periods where reliability problems are exhibited, to identify strategies that can be implemented to improve the overall reliability ratio for the Interstate system. The new measure can be used as an indicator of the travel time variability considered by shippers and suppliers. The change also allows for incremental improvements to be recognized in the measure outcome, which was a concern raised by many commenters in the design of the proposed reliability measures.

3. Relationship Between the Freight Measure Provisions and the National Freight Program and State Freight Planning

The California Association of Councils of Government requested that the rulemaking clarify the relationship between the freight measures and the FAST Act rulemaking on Interim National Multimodal Freight Network, particularly with regard to FAST Act freight funding programs, including FASTLANE.

The Connecticut and Texas DOTs noted that the rule does not outline how the proposed critical urban and critical rural freight corridors, required to be developed under FAST Act, will be integrated into the NPMRDS dataset. There is concern that this integration will require substantial effort and resources by State DOTs.

The Nebraska and Texas State DOTs commented that there is no need to establish additional reporting requirements for freight bottlenecks because bottlenecks and performance measures will be addressed in the State’s freight plan required in 49 U.S.C. 70202 and thus a separate report seems redundant. The Texas DOT suggested

that reporting on multimodal bottlenecks can be done by including a section in a State freight plan.

The FHWA recognizes that the FAST Act made a number of substantive changes in the freight area, including establishing two new funding programs. These new programs did not change the requirement under 23 U.S.C. 150(c) to assess freight movement on the Interstate System. One of the new funding programs is the National Highway Freight Program to improve the efficient movement of freight on the National Highway Freight Network (NHFN). The statute requires FHWA to establish the NHFN, which consists of the following components: The Primary Highway Freight System (PHFS), Critical Rural Freight Corridors (CRFC), Critical Urban Freight Corridors (CUFC), and those portions of the Interstate System that are not part of the PHFS. Therefore, the NHFN includes the entirety of the Interstate system—the same system used to assess freight movement in this rule. Although NHFP funding eligibility is limited to projects on the PHFS, CRFC, and CUFC (which may not include the full Interstate System in a State), FHWA does not believe that this should limit the applicability of the measure in the rule to assess freight movement. Other program funding, such as the National Highway Performance Program, may be used for projects to improve both freight performance on the entire Interstate System.

The NPMRDS includes travel times for the full Interstate System. State DOTs and MPOs will have the data they need in the NPMRDS to meet the freight measure requirements in this rule. There is no requirement for State DOTs and MPOs to supplement the NPMRDS with travel time data to represent roadways on the NHFN that are not on the Interstate System.

The performance management statute requires State DOTs to biennially submit performance reports (*i.e.*, State Biennial Performance Reports in § 490.107) that include freight bottleneck analyses. A good source for these analyses is the State freight plan under 49 U.S.C. 70202, which is required by the FAST Act in order to obligate NHFP funding after December 4, 2017. There can be coordination between the bottleneck reporting for performance measures and freight plans; however, the timing for the State Biennial Performance Reports and 5-year updates to State freight plan is different. In recognition of this similar requirements, FHWA will allow State DOTs to refer to the State freight plan bottleneck analysis in their State Freight

Plan to meet the freight bottleneck reporting requirements of 23 U.S.C. 150(e) if the freight plan has been updated since the previous State Biennial Performance Report.

4. Weighting by Truck Volume

The Virginia and Minnesota DOTs, Oregon Metro Council, Metropolitan Council, and the Joint Policy Advisory Committee on Transportation recommended weighting the reliability measures by applicable vehicle volumes. The Oregon Metro Council and Joint Policy Advisory Committee on Transportation also provided details in their comment on how to weight the reliability measure by volume and recommended FHWA support and fund a better means of obtaining vehicle classification volume data.

The AASHTO and several State DOTs opposed weighting the measures by truck volumes, because it would create additional work to calculate the measure.

The FHWA considered the comments suggesting that the freight reliability measure be weighted by truck volumes. Putting a lesser weight on a segment of the Interstate that is avoided by freight shippers due to poor performance would be contrary to the intent for the performance measure.

The reasoning for weighting, as noted by several commenters, is that it would more strongly emphasize sections of roadway that carry higher truck volumes. The FHWA evaluated the impact of weighting by truck volumes and concluded that for the Interstate System, to which this measure only applies, providing for reliable travel times is equally important across the full system, regardless of the level of use by trucks. If the freight performance measure is applied to a range of roadway functional classifications other than the Interstate System, then weighting the measure for truck volume would be more important in determining which roadways serve as major freight routes.

The FHWA further concluded that some shippers monitor the performance of the roadway system and avoid segments of the Interstate when conditions could impact on time delivery. The FHWA's analysis of Interstate corridors showed that, in some cases, areas with poor reliability tended to have lower truck volumes, indicating that the practice of avoiding segments to achieve on time delivery could impact the effectiveness of the measure if it were weighted by truck volumes.

For these reasons, the freight performance measure will not be weighted by truck volumes.

5. Vehicle Classes

The AASHTO and New York State Association of Metropolitan Planning Organizations recommended that FHWA define freight as combination trucks (FHWA classes 8–13). The AASHTO mentioned that this group of vehicles is representative of most significant freight activity on Interstates. The AASHTO also recommended that the NPMRDS only include the data for those classes. The Connecticut DOT recommended that FHWA define freight as combination trucks (FHWA classes 8–13) and require that NPMRDS dataset only include those classes. The Delaware DOT noted that NPMRDS only includes certain classes of trucks and questioned whether this is accurate.

The FHWA concluded the comments do not require a change to the rule. The data set includes a sample of fleet vehicles. A range of trucks is included, but data are more heavily sampled toward Interstate truck traffic, which would include FHWA vehicle classes 8–13. The FHWA will provide additional guidance on what vehicle classes are included in the NPMRDS dataset.

6. Definition of Freight Bottlenecks

Many commenters noted that the 50 mph speed threshold to define congested conditions for freight movement was not an effective indicator of “freight bottleneck.” A freight bottleneck can result from a combination of features, including capacity constraints, highway interchanges, locations with geometric constraints, bridges with clearance or weight limitations, or steep-grades. Also, significant bottlenecks to freight movement are often off the Interstate and the NHS, such as arterial streets, intermodal connectors, and first and last miles to freight origins and destinations. The AASHTO and a number of agencies suggested the term “freight bottleneck” be changed to “truck freight bottleneck” for clarification since it only applies to truck traffic, and not to other modes such as rail or waterway.

The definition of “freight bottleneck” has been changed to “truck freight bottleneck” and revised to provide a general description that allows State DOTs to determine where truck freight bottlenecks are occurring based upon individual context. The definition also does not limit the location to the Interstate. Each State DOT will need to define what constitutes bottlenecks based upon the specific context of the State and the local impediments that

each State experiences with regard to freight movement.

E. Subpart G—National Performance Measures for CMAQ Program—Traffic Congestion

1. Excessive Delay Measure

a. Applying Peak Hours to Excessive Delay Measure To Create Peak Hour Excessive Delay

The Response to Comments section for subpart E describes FHWA's rationale for consolidating the PHTTR measure and Excessive Delay measure from the NPRM into a new CMAQ Traffic Congestion measure: Peak Hour Excessive Delay (PHED). The PHED measure applies peak hours to the original Excessive Delay measure in order to focus on traffic congestion experienced during peak hours in applicable urbanized areas. Other aspects of the original Excessive Delay measure were also changed in response to comments, as explain in the following sections.

b. Peak Hour Time Periods

Originally, these comments related to the peak hours defined in the PHTTR measure. The FHWA has included this discussion of peak hour comments under the CMAQ Traffic Congestion section because the peak hour designation now applies to the Excessive Delay measure. The AASHTO requested the inclusion of 9:00 to 10:00 a.m. and the Hampton Roads Transportation Planning Organization requested 3:00 to 4:00 p.m. Other commenters requested that FHWA maintain consistency between the hours used in the LOTTR and PHTTR measure.

The FHWA agrees that consistency in the time periods for all travel time measures would simplify the approach to calculate the measures and reduce the amount of data needed for the calculation of all measures. The FHWA also recognizes that different areas experience peak periods at different times of the day. For this reason, FHWA has adjusted and provided flexibility in defining the time periods for the PHED measure to be more consistent with the reliability measures. The FHWA felt that it was important to keep the time periods within 6 a.m. and 8 p.m. to ensure for consistency in the all of the measures at a national level. The adjustments in the final rule added a 4th hour to both the morning and afternoon peak periods. The morning period has been extended to 10 a.m. and to provide flexibility to State DOTs and MPOs, two options have been provided to expand the afternoon period—starting earlier to

begin at 3 p.m. or extending later to end at 8 p.m.

c. Traffic Volume Profiles

In the NPRM, FHWA required State DOTs and MPOs to develop hourly volumes based on actual vehicle counts or AADT. Several commenters were concerned that traffic volume data may not be accurate at the granularity required in the NPRM and suggested FHWA fund better volume data collection if data collected by State DOTs and others are not adequate.

The commenters also requested more information about developing hourly volume profiles from actual vehicle counts or AADT. Some commenters suggested FHWA take AADT information from each State's HPMS submittal and develop traffic volume profiles by time of day and day of the year at a 5-minute bin level⁶⁵ for each reporting segment or make traffic volumes available in the NPMRDS data set so State DOTs and MPOs could calculate average daily vehicle hours of delay.

The FHWA has reduced the number of hourly volumes that need to be estimated to just the peak hours (*i.e.*, 8 hours daily), requiring only peak hour factors to be used to estimate volumes. The FHWA will provide guidance on appropriate methodologies for estimating the hourly volumes for use in this measure.

d. Person Throughput Versus Vehicle Throughput

The FHWA received thousands of comments in favor of making the PHTR more person-focused. The Southwest Energy Efficiency Project, Conservation Colorado, and the National League of Cities suggested using average vehicle occupancy and transit ridership to measure person-hours of excessive delay. The Virginia DOT suggested that the National Transit Database (NTD) could provide data on transit vehicle/bus occupancy, while default values could be used for vehicle occupancy where no data is available. The COMPASS stated that a road mileage-based measure can be counterproductive and encouraged FHWA to measure impacts in terms of people instead. The AASHTO and the Maryland DOT cited both the National Household Travel Survey (NHTS) data as a good representation of actual vehicle occupancy and the Census Transportation Planning Products program that develops robust work-

based trip data. With these data sources, the highway delay metric could be normalized by the number of workers commuting by car.

As with the NHPP reliability measures, FHWA agrees with these comments and believes that the PHED measure would be improved if it represents the cumulative delay of all people using the NHS and not just the delay experienced by vehicles. The FHWA believes that this approach will encourage the improvement of corridors that have higher person throughput. For this reason, the PHED metric in the final rule requires the use of average vehicle occupancy (AVO) factors for cars, buses, and trucks and hourly traffic volumes to calculate person-hours of excessive delay. The FHWA recognizes the variations in AVO among and within urbanized areas and the challenges in obtaining segment-level AVOs. Therefore, to support this approach, FHWA will establish AVO factors for State DOTs and MPOs to use for each applicable urbanized area using the National Transit Database for buses and national surveys, such as the American Community Survey, for cars. The FHWA also recognizes that urbanized areas may have more specific AVO data, and the final rule provides flexibility for State DOTs and MPOs to substitute these data.

e. Thresholds

The FHWA received many comments disagreeing with the selection of the 35 mph threshold for freeways and 15 mph threshold for other NHS roadways. Commenters noted that these thresholds do not adequately reflect different circumstances across the country and, in particular, urban areas. Additionally, AASHTO and the Connecticut and Washington DOTs warned that States may have an incentive to focus a project on a reporting segment that is just slightly over the set thresholds instead of the areas that need it the most in order to impact the final number of hours of excessive delay.

Commenters were also concerned that information about the Functional Class of each segment may not be available in HPMS or NPMRDS, and that this could make assigning speed thresholds to different roads challenging. Commenters requested various changes, including using 50 or 60 percent of the posted speed limit (PSL) and leaving the speed threshold to be set by the State DOTs or MPOs.

The FHWA agrees that the use of absolute thresholds may not be appropriate for all areas and that it would be more appropriate to use a threshold based PSL provided this

threshold does not exclude speeds that have been demonstrated to generate emissions that adversely impact air quality. The Washington State DOT conducted analysis on the optimal travel speed to maximize throughput for its State highways and determined that the optimal flow speed was roughly 70–85 percent of PSL. Speeds in this range would have optimal spacing between vehicles while speeds less than 70 percent of the posted speed limit are considered congestion. Speeds less than 60 percent of the posted speed limit are considered to be severe congestion by Washington State DOT. Additionally, FHWA found in previous analysis that emissions rates in grams per mile for criteria pollutants are typically higher at lower speeds (*i.e.*, 0–20 mph).⁶⁶ The FHWA believes that a 20 mph speed threshold connects traffic congestion to criteria pollutants. At speeds higher than 20 mph, emissions are significantly lower.

As a result, FHWA has revised the excessive delay threshold in the final rule to be 60 percent of PSL, with a minimum limit of 20 mph. The 60 percent of PSL threshold was selected based on comment suggestions, and the limit of 20 mph was selected based on speed levels that have been associated with emission impacts on air quality. This speed threshold applies to all Functional Classes of roadways, removing the need to identify the Functional Class of each segment. The FHWA recognizes that PSLs are not provided in the NPMRDS dataset. The FHWA will make provisions within the HPMS to capture PSL as a field that can be populated for the full extent of the NHS. The FHWA encourages State DOTs to report PSLs for all NHS segments in the HPMS. The FHWA believes it is important for State DOTs and MPOs to collect and report posted speed limit to understand operating expectations of the NHS.

f. Use of Population for Normalization

The AASHTO and several State DOTs expressed concern over the per capita denominator in the Excessive Delay Per Capita measure, stating that it inaccurately assigns excessive delay to all people in all urbanized areas, rather than just the highway drivers who are impacted. The commenters further argued that urbanized areas with high levels of Interstate through traffic will have misleadingly high values because the delay is being experienced by

⁶⁵ The FHWA has changed the time bins to 15 minutes for the final rule, but the comments reflected the 5 minute bins proposed in the NPRM.

⁶⁶ ICF for FHWA, *Multi-Pollutant Emissions Benefits of Transportation Strategies*, 2006. https://www.fhwa.dot.gov/environment/air_quality/conformity/research/mped.pdf.

travelers from outside the urbanized area. The commenters suggested that the measure be normalized by commuters using a personal vehicle on the roadway network. Furthermore, the Connecticut and Texas DOTs, and AASHTO commented that the proposed excessive delay measure would produce misleading measure trends when using incomplete data and when no imputation is used. The AASHTO and WSDOT recommended that FHWA divide annual excessive delay by the estimated commuter population rather than overall population to get a more realistic idea of how the people experiencing the delay are affected.

The Atlanta Regional Commission suggested that the congestion measure should be scaled on observed or estimated travel demand (*e.g.*, peak period person throughput, number of peak period trips, peak period VMT). The travel demand also could be gauged in multiple levels: NHS travel demand only, total vehicle travel demand (beyond the NHS), or even total travel demand (*e.g.*, number of peak period trips occurring across all modes). The commenter recommended that HPMS data on annual VMT by functional class could be used. The Delaware DOT urged that FHWA use an estimate of how far people travel to work, while the Delaware Valley Regional Planning Commission recommended that the annual hours of excessive delay per capita should not be based upon total population, but rather should be limited to commuters using a personal vehicle on the NHS roadway network during the time periods it is being measured (*i.e.*, morning and evening peak periods). The Georgia DOT suggested FHWA use Annual Hours of Excessive Delay per thousands or millions.

In response, FHWA compared different methods to normalize the measure in areas that rely heavily on highways and others that provide several modes of transportation. The FHWA found that population was as effective as other methods to normalize the measure and found that, in areas where travelers tend to use non-highway transportation modes, the measure did not unfairly bias the outcome in the area's favor. In addition, population data are readily available in national data sources. For these reasons, FHWA retained the use of population in the final rule to normalize the measure. The FHWA feels that other approaches to normalize the measure would add unnecessary complication to the method. The FHWA plans to revisit this measure after the completion of its multimodal research study in Fall 2018.

g. Census Annual Population Estimates in Lieu of Decennial Values

Several commenters commented on the proposed methodology for the traffic congestion performance measure, which uses the population in the area to develop a "per capita" estimate. The Illinois DOT claimed that using the per capita denominator for the Total Excessive Delay per Capita overestimates the users of the NHS System. The North Jersey Transportation Planning Authority recommended using the most recent population estimate for the urbanized area instead of the decennial values. The Texas DOT stated that using the most recent U.S. Decennial Census (*i.e.*, 2010 population numbers that are already 6 years old) for reporting until 2022 or 2023 when the 2020 Census is available will have a negative impact on the urbanized areas of Texas with regard to "per capita" metrics.

The T4A requested discussion in the final rule of how State DOTs and MPOs could use population estimates from 5-year ACS estimates for each-year reporting cycles. The commenter also stated the importance of normalizing the excessive delay measure by dividing the calculation by the total population for the State or MPO, allowing all transportation users to be accounted.

The FHWA agrees with the use of annual population estimates as opposed to the decennial census populations to normalize the excessive delay measure. Using annual estimates will more accurately account for population shifts in large urban areas that are not captured through the decennial census. For this reason, FHWA has revised the approach to determining the population in the final rule for both the PHED per capita measure and to determine urbanized areas that are applicable to the CMAQ Traffic Congestion measures (both PHED and non-SOV Travel). As suggested in the comments, FHWA is requiring annual population estimates to be determined using U.S. Census estimates (*i.e.*, most recent ACS 5-year estimate). The most recent annual population estimate as of one year before the Baseline Performance Report is due is to be used to determine urbanized areas that are applicable to the CMAQ Traffic Congestion PHED measure. These areas will remain applicable for the full duration of the performance period, regardless of population changes that may occur within the period (4-year time period). The FHWA feels that keeping the applicable areas for the duration of the performance period is important to simplify the implementation of the

requirements. The most recent annual population estimate will be used each time the PHED per capita measure is calculated. The FHWA believes that this approach responds to the concerns regarding population shifts in large areas.

The FHWA does not agree that the populations should be determined for specific times of the day or days of the week as suggested by some commenters due to the complexity of implementing such a method.

h. Outliers in Speed Data

The Oregon and Washington State DOTs commented that since the null and outlier procedure for the excessive delay measure was not the same as the system performance or freight measures, they assumed that for the excessive delay measure, 5-minute bins with no recorded travel times as well as those data points over 300 seconds will be excluded. The State DOTs recommended that the procedures for all outlier and null data be consistent in the final rule. The AASHTO expressed concern over the excessive delay calculation, which is compounded by outliers in the dataset. The AASHTO argued that the proposed descriptions of equations can create the opportunity for unstable calculations; that is, that the delay may be grossly overestimated on the interplay of the length of each segment, the evaluation period, and the speeds. This could lead to overestimates of delay during periods of very low speeds or road closures if volume limiting is not used. The AASHTO stated that this instability can be addressed with maximums of delay that relate to the length of reporting period. The AASHTO further stated that the outliers in NPMRDS further compound this issue; however, a gapless or imputed data set would not be immune to the volume problems.

The FHWA evaluated the impact of applying an outlier threshold to the final travel time derived measures and found that the effect of excluding very slow and very fast speeds on the outcome measures did not warrant the burden that would be required to remove outliers. Although the removal of outliers had the greatest effect on the excessive delay measure (as this measure cumulates all excessive travel times), the use of allowable techniques, such as path processing, to smooth out point probe sources will reduce the occurrence of outliers in the data set. For this reason, FHWA removed the requirement to exclude outliers from the travel time data set.

In the NPRM, FHWA limited the travel time for a given segment to 300

seconds, equivalent to 5 minutes. This ensured that excessive delay could not exceed the length of the time period. Since 15 minute bins are now used instead of 5 minute bins, FHWA changed this maximum to 900 seconds. Since there is no outlier removal, all 15 minute bins with travel times will be used and subject to the 900 second limitation. The FHWA encourages State DOTs and MPOs to share their strategies using volume limiting techniques to address concerns when extremely slow speeds exist. The FHWA in the final rule allows removal of any travel time data in the calculation that could have been recorded with the roadway was closed.

2. Decision To Include a Multimodal Measure

Tens of thousands of commenters, through campaigns from T4A, American Heart Association, and others, raised concerns about the vehicle-focused nature of the 8 measures proposed in the NPRM. Many asserted that determining the performance of the NHS and the impact of congestion relies on an understanding of the entire surface transportation system, including all available modes of travel. Commenters explained that considering pedestrians, bicyclists, public transit riders, and other travelers in transportation decisions, provides a fuller picture of system performance, encourages policies that reduce traffic congestion, and helps meet the goal of efficient investment of Federal transportation funds. They asserted that these transportation modes, while often local in implementation and reach, deserve recognition in a national performance measure because they contribute to transportation efficiency and reliability, promote public safety and health, improve the livability and walkability of urban neighborhoods, improve environmental sustainability, and reduce costs for the travelling public. One commenter noted that the vehicle-focused approach in the NPRM disadvantages low-income communities where vehicle ownership rates are often lower compared to suburban and rural areas.

Commenters discussed multimodal benefits generally, but also specifically in the context of traffic congestion. Many argued that non-SOV modes should be explicitly included in a measure to reflect emissions avoided by these modes. Commenters suggested making the NHPP Reliability and CMAQ Excessive Delay measures more multimodal by including buses in average vehicle occupancy. Many commenters expressed support for a

new, separate multimodal congestion performance measure. Many commenters provided suggestions for the design of such a multimodal measure, including:

- Non-single occupancy vehicle mode share
- Percent of NHS mileage with a transit alternative to driving
- Ratio of transit passenger miles traveled to vehicle miles travelled
- Shorter multimodal journey-to-work travel time than average
- Number of jobs accessible within a given time budget
- Avoided delay provided by public transportation

Commenters suggested many possible data sources that could be used to calculate a measure, including the American Community Survey (ACS), National Household Travel Survey (NHTS), National Transit Database (NTD), General Transit Feed Specification (GTFS), regional vehicle capacity, and pedestrian and bicycle counts (e.g., from the Travel Monitoring Analysis System (TMAS)). One commenter identified planning tools State DOTs could use to determine the impact of multimodal transportation, including the TDM Effectiveness Evaluation Model (TEEM), TDM Assessment Procedure (TDMAP), Trip Reduction Impacts of Mobility Management Strategies (TRIMMSTM), and Project Evaluation Toolkit (PEToolkit). Commenters suggested FHWA leverage existing datasets and data collection efforts and work with partners such as the Transportation Research Board, the U.S. Census Bureau, and FTA to enhance existing datasets or develop a multimodal dataset.

In the NPRM, FHWA noted the data limitations that constrain creating and requiring a multimodal performance measure and presented specific questions to better understand what could be implemented in this final rule. A number of the measures suggested by commenters still present significant challenges in national data collection and analysis. The FHWA recognizes that robust multi-modal system performance measurement requires additional research and development, and is engaged in a significant research project, Multimodal System Performance Measure Research and Application, to identify more ideal multi-modal system performance measure(s) and the data required to calculate them. However, commenters also provided more information to FHWA to better understand how some State DOTs and MPOs may have other data available to measure modal share more accurately at

a local level. The FHWA now believes that nationally consistent data, as well as these more detailed local sources, make it possible to create a basic assessment of multimodal system performance through the measure of the portion of non-SOV travel. A more detailed discussion of the data elements of this measure is available in the next section. The FHWA will revisit the measures related to multimodal travel following the completion of its research study in the Fall of 2018.

After reviewing these comments, FHWA has decided to include a new multimodal measure, the portion of non-SOV travel, as a CMAQ Traffic Congestion measure. The FHWA believes non-vehicular modes play an important role in reducing levels of criteria pollutants in urbanized areas, and because transportation in urbanized areas is inherently multimodal, it is important to account as much as possible for the options that are available to travelers in those urbanized areas. This measure will help carry out the CMAQ program, as the program recognizes investments that increase multimodal solutions and vehicle occupancy levels as strategies to reduce both criteria pollutant emissions and congestion. The measure adopted in this rule is the percent of non-SOV travel. The measure includes modes that are included in the ACS Journey to Work data, which generally includes all modes that are not SOV and include travel avoided by teleworking.

Based on the comments, FHWA provides three options for State DOTs and MPOs to calculate modal share. The first option is use of the American Community Survey Journey to Work mode share data (updated annually to every 3 years depending on size of urbanized area). These data are nationally consistent, but have limitations in creating a comprehensive picture of multimodal travel. The second option is for State DOTs and MPOs to use locally specific surveys, which may be more accurate than the ACS. The third option is for State DOTs and MPOs to use volume counts for each mode to determine the percent non-SOV travel. While use of the second or third options may result in reporting that is not nationally consistent, FHWA believes that any of these data sources (national or local) can be used to create a meaningful non-SOV mode share measure. Including these options also encourages States and MPOs to develop and use the local measurement methods to help build a more accurate national picture of mode use in the United States.

Non-SOV travel may include travel via carpool, van, public transportation, commuter rail, walking, or bicycling, as well as telecommuting.

The applicability of the CMAQ Modal Share measure is the same as for the CMAQ Peak Hour Excessive Delay measure. The FHWA decided to use the same geographic applicability because FHWA views these two CMAQ Traffic Congestion measures as complimentary, yet different, as both yield important information useful to understanding traffic congestion and the methods available to address it.

3. Data for Multimodal Measure

The Oregon and Washington State DOTs suggested that FHWA use the American Community Survey (ACS) for transit or multimodal-related data. Other commenters suggested using ACS data to gain a baseline of regional average vehicle occupancy and then coupling that with technology-based methods to measure AVO and per-person throughput along roadways. The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation suggested adding journey-to-work mode share data from the ACS as a measure under subpart G to complement the annual per-capita VMT measure. The T4A suggested that FHWA should work with the U.S. Census Bureau to improve the ACS so that it reflects trip purpose and multimodal trips, which work could in turn inform improvements to the NHTS.

Some commenters explained that they do not have robust, reliable data for surface modes other than highways, transit, commuter rail, and passenger rail. In Maryland, for example, these data are available only in the urbanized areas affected by the congestion performance measures. The Delaware Valley Regional Planning Commission stated that FHWA should improve the hourly volume estimation as proposed for the excessive delay measure calculation, because accounting for volumes would be very helpful for project prioritization and would also set the stage for bringing in transit passenger volumes and eventually bicyclist and pedestrian volumes. The Florida DOT described its approach for analysis of volumes from continuous traffic count stations. The New York State DOT cited the challenges of developing hourly traffic volume data for use in the proposed performance measures and noted that their State's program is on a 3-year cycle (as required by HPMS) and not the 2-year cycle described in this rulemaking. The FHWA agrees with the many commenters that suggested using the

ACS data to measure modal share because the data are readily accessible to all potential users and is nationally consistent. The FHWA adopted this approach because it agrees that some State DOTs and MPOs do have the capability today to count different modes of travel. The FHWA also recognizes the limitations of using a survey-based data set and has provided additional options for State DOTs and MPOs to calculate this measure. State DOTs and MPOs are not required to use mode counts, nor are they required to submit them to FHWA. The FHWA acknowledges the importance of a nationally consistent data to compare urbanized areas, but also recognizes that mode count data is an area of ongoing development and could help spur the development of improved measures in the future. The FHWA also believes that increasing the quality and quantity of non-vehicular mode observations is useful in developing a complete perspective on the entire transportation system. As a result, State DOTs and MPOs have the option of using survey-based or count data to calculate this measure. For State DOTs and MPOs that choose to use count data, FHWA encourages but does not require that these data are voluntarily submitted to FHWA via national sources or databases (such as TMAS, NTD, and/or GTFS-RT).

4. Applicability of the CMAQ Traffic Congestion Measures

In the NRPM, FHWA requested comments on whether the CMAQ Traffic Congestion measure should apply to smaller urbanized areas, including those with populations over 200,000. In response, most commenters—including AASHTO, 9 State DOTs, National Association of Regional Councils (NARC), NYSAMPO, and the Association of General Contractors—supported applying the CMAQ Traffic Congestion measures to urbanized areas in nonattainment or maintenance areas with a population of more than 1 million. Some commenters in support of a population threshold of 1 million argued this is consistent with congressional intent to require only those MPOs serving areas with more than 1 million people to prepare a CMAQ performance plan (see 49 U.S.C. 149(1)). They also argue it would limit the burden of compliance to those areas most likely to experience congestion.

Two commenters supported population thresholds below 1 million. The T4A supported a population threshold of 200,000, noting that 23 U.S.C. 149(l) requires a performance plan for mega-regions with more than 1

million people, but does not supersede 23 U.S.C. 150(c). The commenter added that title 23 makes a distinction between areas above and below a population of 200,000, which could be applied to this measure. The Natural Resources Defense Council stated that the restriction on congestion measurement to areas with a population over 1 million is arbitrary and unwarranted and should be removed.

The NARC and NYSAMPO also expressed concern about the applicability of urbanized area as the appropriate geography. The NYSAMPO further expressed concern about the relationship of this requirement to the separate NPRM on MPO Coordination.

The final rule revised the applicability of the CMAQ Traffic Congestion measures to urbanized areas in nonattainment or maintenance areas with a population of more than one million, before expanding to areas with a population over 200,000 for the second and all subsequent performance periods. First, FHWA believes there is public benefit to expanding over time the applicability of the CMAQ measures to additional cities and will help to contribute to achieving the national goal of congestion reduction. The FHWA believes Congress's special emphasis on MPOs located in transportation management areas, which are urbanized areas with over 200,000 in population, is informative in this regard. Congress determined these areas need to address congestion issues, and, under 23 U.S.C. 134(k) Congress has required these MPOs to address congestion management through a process that provides for effective management and operation of new and existing transportation facilities, including development of congestion management plans. The FHWA expects that expanding the applicability of these measures will lead to better planning and operational decisionmaking, especially with respect to congestion management. Applying these measures to this broader group of urbanized areas will contribute valuable information to the congestion management process under 23 U.S.C. 134(k)(3)(A) and is consistent with the DOT Beyond Traffic initiative to address congestion, including in metropolitan areas.

Expanding the applicability of these measures in subsequent performance periods to urbanized areas of 200,000 people or more will yield a larger pool of potential benefits from evaluations of mode share and reductions in peak hour excessive delay as States MPOs and Cities respond to the CMAQ performance measures. Additionally, sharing best practices among a larger

pool of urbanized areas may lead to innovative strategies to reduce peak hour excessive delay and to estimate or count transportation trips on all modes. As part of the Modal Share measure, State DOTs and MPOs are encouraged to report data not currently available in national sources (e.g., pedestrian or bike counts) to FHWA, and expanding the applicability of these measures will improve the quality and quantity of these data nationwide.

Recognizing that these smaller urbanized areas may need more time to implement this requirement because many may not have the same level of experience or resources to consider these issues as do larger urbanized areas, FHWA decided to provide these smaller urbanized areas more time to implement the measure. The phase-in period will give smaller MPOs time to understand the measure, what is necessary to calculate the measure, and how setting targets will work. The phase-in period will reduce the overall burden for State/MPO coordination with respect to target setting for both of the CMAQ Traffic Congestion measures. The PHED measure has also been simplified to require less coordination and less data (i.e., only requiring data during peak hours) than the proposed excessive delay measure in the NPRM. Although the Modal Share measure is new, one option uses widely available ACS data and is simple to calculate.

The FHWA believes that urbanized areas should be the boundary used to define applicable areas, as these areas are used in practice today to define the minimum planning scope of metropolitan areas. The FHWA acknowledges the comment regarding deferring a decision on the area of applicability of these measures until completion of the NPRM on MPO Coordination and Planning Area Reform. The FHWA declines to defer the decision in this rule. This rule provides sufficient lead time to accommodate any coordination or decisionmaking requirements regarding the applicability of the CMAQ PHED measure that may arise out of a final MPO rule.

F. Subpart H—National Performance Measure for the CMAQ Program—On Road Mobile Source Emissions

1. General Comments

Several commenters expressed support for the proposed on-road mobile source emissions performance measure. Other commenters expressed support for FHWA's overall approach of using emission reductions by pollutant for the performance measure for on-road

mobile source emissions. One commenter argued that the nation's transportation system is responsible for roughly 23 percent of the country's emissions and any regulations that require State DOTs to monitor emissions released by automobiles will help reduce emissions drastically, and another recommended that FHWA develop a measure of emissions per person trip for non-freeway NHS roads. Several commenters urged FHWA to incorporate GHG emissions reduction reporting into the on-road mobile source emissions performance measure.

After careful consideration of these comments, FHWA retained the CMAQ on-road mobile source emissions measure, with some modifications as explained in response to specific comments. The FHWA decided after reviewing all the comments regarding a GHG measure to apply it to performance of the NHS in all States and MPOs under NHPP.

2. Concerns About MPO Targets and Reporting

Because the proposed on-road mobile source emissions measure did not include a provision for State DOTs to approve MPO emission reduction targets, the Kentucky Transportation Cabinet expressed concern that the rule would allow an MPO to attempt to force a disproportionate amount of CMAQ funds to be awarded to its area by setting an overly aggressive target and recommended that targets for the on-road mobile source emissions measure should only be required for State DOTs and not MPOs, with a provision for State DOTs to concur with MPO targets. The Oregon DOT suggested that States have flexibility in determining the appropriate target setting entity, whether it is a State DOT or the MPOs.

The FHWA believes that State DOTs and MPOs have the authority to establish their targets at their discretion. Moreover, MAP-21 does not provide FHWA the authority to approve or reject State DOT or MPO established targets. No changes were made in response to these comments.

3. Applicability

Several commenters, including AASHTO and several State DOTs, recommended that FHWA revise the proposed on-road mobile source emissions performance measure so that it only applies to urban areas with populations of over 1 million. The AASHTO expressed concern that smaller urban areas may not have the capacity (resources and staffing) to address the on-road mobile source emissions measure. Further, AASHTO,

Connecticut DOT, and Washington DOT commented that limiting the on-road mobile source emissions measure to urban areas with over 1 million populations would be consistent with congressional intent, because the requirement to prepare a CMAQ performance plan is limited by statute to MPOs serving areas of over 1 million in population. The Washington State DOT and Oregon DOT also reasoned that because smaller urban areas do not receive large amounts of CMAQ funding, those MPOs may use multiple years' allocations to fund a single project, which would result in such MPOs having no reportable benefits for certain years and give a false impression that an MPO failed to meet a target. Further, these commenters expressed concern that setting realistic targets may prove challenging for smaller MPOs that have a limited sample size of past projects. The North Central Texas Council of Governments and several State DOTs recommended that reporting areas be consistent between CMAQ congestion and on-road mobile source emissions performance measures in order to make reporting simpler. Specifically, the State DOTs recommended that the on-road mobile source emissions measure be modified so that it would apply to the same areas as the CMAQ congestion measure in the NPRM, only in urbanized areas with a population of over one million in nonattainment or maintenance areas for criteria pollutants under the CMAQ program. The commenters argued that this approach would allow for consistency with Congress's decision to limit the requirement for the preparation of a CMAQ performance plan to areas of over one million in population.

In contrast, Oregon Metro Council and the Joint Policy Advisory Committee on Transportation urged FHWA to apply the on-road mobile source emissions performance measure to all CMAQ program recipients, regardless of size of population.

Several State DOTs and AASHTO argued that tying emissions reduction to expenditures for apportionments for the entire CMAQ program will result in a negative effect on a State's statutorily given right to utilize flexible funding, which would contradict the purpose of the flexibility provision of 23 U.S.C. 149. As a result, they stated that 490.803 should apply only to non-flexible CMAQ funds. The AASHTO, Connecticut DOT, and Montana DOT urged FHWA not to require emissions data reporting as to flexible CMAQ funds, because requiring such reporting could indirectly pressure States to

forego the flexibility provided by Congress. The Mississippi DOT urged FHWA to make concessions for rural areas and reduce or eliminate CMAQ reporting requirements for non-urban areas, and Oregon DOT asked that rural areas be exempt from the on-road mobile source emissions measure as the major contributors to the pollutions in such areas tend to be from road dust and topographical effects.

Since all ozone, carbon monoxide, or particulate matter nonattainment and maintenance areas, regardless of size, are eligible to receive CMAQ funds and all CMAQ funded projects must demonstrate an emissions reduction, FHWA has concluded that the emissions measure should apply to all such areas regardless of population. In contrast to the CMAQ PHED and Modal Share measures, the emissions measure does not raise significant challenges to achieve a fair balance between the benefits of the measure and the burden of applying it. The burden for reporting on this measure is easier than for the CMAQ traffic congestion measures, since the emissions measure data come from an existing database used since 1992. The FHWA has not made any changes in the final rule based on these comments.

Additionally, States with rural areas designated nonattainment or maintenance may obligate CMAQ funds in those areas. Therefore, they should also be subject to this measure. The FHWA has not made any changes in the final rule based on this comment. Finally, FHWA agrees that Congress provided the areas with flexible funds the ability to use those CMAQ dollars on CMAQ or Surface Transportation Block Grant (STBG) eligible projects. The FHWA does not agree, however, that this measure should be limited only to mandatory CMAQ projects. There is enough flexibility in how a State DOT or MPO establishes its target that it can account for any flexible funds it plans to spend on STBG eligible projects at that time. Therefore, FHWA has not made any changes in the final rule based on this comment.

4. Applicability of New Standards

One commenter encouraged FHWA to acknowledge the importance of good air quality in borderline nonattainment areas in the air quality performance measure, and another expressed concern that as the NAAQS become more stringent over time, the workload for State DOTs and MPOs to comply with the performance measure will increase because more nonattainment areas will be designated. Others suggested the rule build in a later deadline for such cases

and provide specific authority for a waiver to be granted to affected States and MPOs in terms of deadlines—when an area is newly designated as nonattainment, so that it can have more time in setting targets relevant to the affected area. Alternatively, GDOT recommended that nonattainment and maintenance designation for the baseline performance period be as of October 1, 2017 (one year in advance of first baseline report). The GDOT noted that given significant uncertainty over designation and revocation timeframes experienced over many years, this baseline would provide some assurances and, hopefully, avoid unnecessary resource expenditure based on assumed designations before October 2018.

The FHWA does not agree that special consideration or a waiver is needed for newly designated nonattainment areas. Potential areas have sufficient notice that they may be designated nonattainment. Therefore, States do not need more time to meet the performance measure requirements than afforded the other areas to establish targets. In addition, FHWA has clarified in the final rule that the baseline nonattainment and maintenance area designations should be based on area status as of October 1, 2017.

5. Reporting

Several commenters requested clarity on the timeframe for reporting emissions reductions. Several commenters suggested that emission reduction benefits for CMAQ-funded projects should be reported after the project has been completed and is open for use, rather than the first time CMAQ funding is obligated for the project. Others argued that the proposed on-road mobile source emissions measure reporting timing would be disadvantageous for smaller urban areas, because such MPOs sometimes use multiple years' allocations to fund a single project, which could give the false impression that an MPO failed to meet a target if there were no reportable emissions reductions for certain years. These commenters also asked FHWA to clarify the year to which the first March 1 and July 1 due dates apply.

Some commenters suggested that limiting emissions reductions benefits to a single year would understate the actual benefits realized because the life of the benefits last as long as the project, which can be from 1 year (e.g., operations) to decades (e.g., built facilities, locomotive repower projects). For this reason, they recommended that FHWA add two fields to the CMAQ Public Access System—one for year

open to service (or completion year) and one for expected service life, which would allow the benefits for a given project to count beginning in the year open to service and continue to be counted as long as the service life has not been exceeded. They said this approach would avoid the complication that would result from the use of advance construction to initiate projects if the rule relied on the first year of obligation as the emissions reduction benefits trigger. The commenters also suggested that FHWA consider a moving average for emissions reductions to smooth out the uneven implementation of projects, arguing that in some years a target would be exceeded while no benefits may be realized in other years. The Association of Metropolitan Planning Organizations and Fairbanks Metropolitan Area Transport System suggested that it may be better to report benefits on a project specific basis.

The California Association of Councils of Government et al. requested guidance regarding how States and MPOs should reconcile variations in emissions model outputs over time solely due to emissions model updates. Regarding the first performance report, AASHTO and Connecticut DOT asked if the emission reduction assigned at the time the project was entered would be the target value or if the projects need to be recalculated using current emissions modeling, emission factors, etc. to determine whether the target was met.

To keep this measure simple and consistent with the current CMAQ reporting requirements, a project's estimated emissions reductions are only for the first year of full operation. The information is entered in the CMAQ Public Access system only for the first year the project has funds obligated to avoid double counting benefits. The FHWA understands this approach may result in taking credit for a project in a performance period before it becomes operational, but believes the simplicity of this process is appropriate. The March 1 deadline for State DOTs to enter their CMAQ project information in the CMAQ Public Access System is not a new deadline. The CMAQ Program Guidance includes this same date for entering project information for the previous fiscal year. Therefore, this date applies now and will continue to apply with this final rule. The July 1 date is a new deadline for FHWA to ensure all information is in the CMAQ Public Access System. This due date will apply on July 1 after this final rule is effective.

The FHWA clarifies that there is no requirement to recalculate the emissions entered into the CMAQ Public Access

System or to make adjustments to emissions estimates previously entered into the Public Access System when U.S. EPA approves new models. States or MPOs that believe they would not be able to meet a target due to a change in the models can adjust the target at the performance period's mid-point or explain in their final performance report why they were unable to meet their targets due to model-based emissions estimate. The FHWA has not made any changes in the final rule based on these comments.

6. Concerns Related to Quantification of Emissions

Some commenters expressed concerns relating to quantifying emissions for certain projects such as fiber installation and traffic monitoring. Another commenter stated that transit projects may not demonstrate as much emissions reduction as heavy-duty engine replacement projects, even though additional transit service may be necessary to address regional and corridor congestion.

Several commenters asked that FHWA continue to give State DOTs discretion to determine if quantitative CMAQ reporting is required, or expressed support for not being required to quantify emissions benefits in every situation, or argued in favor of States having the ability to update information in the CMAQ database. However, several others commented that they do not want to have to update their emissions because it would not be a good use of resources.

The Oregon DOT and Washington State DOT disagreed with requiring CMAQ projects that fund operations improvements or are aimed at increasing person throughput to show a reduction in emissions, reasoning that latent demand often replaces any capacity made available by operational improvements. The Georgia DOT requested that FHWA provide guidance for establishing targets, because targets could be different by project types and limit/extent, and asked if the single target would reflect the total emission reductions of all projects in the nonattainment area during the 2- and/or 4-year timeframe. Expressing concern that 2- and 4-year targets will be difficult to set based on current information in the CMAQ Public Access System, Oregon DOT recommended that FHWA carry out additional research to determine how to successfully implement the on-road mobile source emissions measure.

Under the CMAQ program, State DOTs and MPOs have the discretion to fund projects where it is not possible or

easy to quantify the emissions benefit. However, these projects will not be accounted for in this performance measure since by the nature of the project, it is not possible to quantify the emissions benefit. Further, FHWA appreciates the concerns raised with respect to lifecycle benefits, but in order to keep the CMAQ reporting system simple and easy to use, it does not require the calculation of life cycle emissions benefits.

States and MPOs must use projects in the 4 years prior to the first performance year as a basis for establishing a target for the first performance period. The projects entered into the System during the 2- and 4-year performance period will be taken as is to calculate the measure. If a State or MPO felt they would not be able to meet a target, they could adjust the target at the mid-point of the performance period or explain in their final performance report why they were unable to meet their targets. The FHWA has not made any changes in the final rule based on these comments.

7. Application Beyond CMAQ Projects

The majority of commenters on this topic expressed concern over limiting the on-road mobile source emissions measure to only those projects that receive CMAQ funding. One argued it would be inefficient, another that emissions reductions from all recipients of CMAQ dollars should be assessed, and another that the best opportunity to reduce emissions comes from operations and capital projects. The Nashville Area MPO and T4A recommended that total emissions reductions be measured for areas designated as nonattainment or maintenance for ozone, carbon monoxide, or particulate matter and that targets under this measure should be set to consider all capital and operational opportunities to reduce emissions, not just those that receive CMAQ funding. Another noted that projects tend to have multiple funding sources. Other commenters recommended that the targets under the on-road mobile source emissions performance measure consider all transportation projects and not just CMAQ-funded projects, or that as emission reductions become more easily estimated, the measure could be expanded to all projects. One commenter encouraged FHWA to focus on successful actions States are taking rather than from where funding is coming. Another recommended that emission reductions should be assessed at the State or region scale.

In contrast, AASHTO and others expressed support for the proposal that the on-road mobile source emissions performance measure not apply to

States and MPOs that do not contain any portions of a nonattainment area. The Virginia DOT further recommended that FHWA consider a region-wide air quality measure, as CMAQ projects are generally a small subset of transportation projects. The AASHTO, Connecticut DOT, and Montana DOT urged FHWA not to require emissions data reporting as to flexible CMAQ funds, because requiring such reporting could indirectly pressure States to forego the flexibility provided by Congress.

The FHWA does not agree this measure should extend beyond the CMAQ program since the performance measure, as defined in 23 U.S.C. 150(c)(5), is specifically tied to the CMAQ program. The FHWA also does not agree that the measure should apply to all States or regions that receive CMAQ funds or that the emissions benefits included should extend beyond the CMAQ program. As noted in the NPRM, attainment areas are allowed flexibility in spending their CMAQ funds whereby projects are not required to adhere to specific CMAQ eligibility requirements. While there are many projects funded with monies beyond the CMAQ program that result in an emissions benefit, the performance measure, as defined in 23 U.S.C. 150(c)(5), is specifically tied to CMAQ program. The purpose of the CMAQ program is to fund transportation projects or programs that contribute to the attainment or maintenances of the NAAQS in nonattainment or maintenance areas. The FHWA has not made any changes in the final rule based on these comments.

8. Attainment Definition—Removal of Areas Beyond 20-Year Maintenance Plan

Oregon DOT suggested that an area should be considered attainment if it has reached the end of its 20-year maintenance plan.

The FHWA agrees that when an area reaches the end of its 20-year maintenance plan for an applicable pollutant, the CMAQ performance reporting requirement should no longer apply. Changes were made to the definition of "maintenance area" in section 490.101 and to the data requirements in section 490.809(c).

9. Modification of Emissions Information at 2-Year Report

The Connecticut DOT recommended that FHWA allow revisions to the applicability of the on-road mobile source emissions performance measure to certain criteria pollutants if the NAAQS designation status changes

during the 4-year performance period, especially at the 2-year midpoint.

The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation expressed concern that the proposed rule was unclear about how to address delay and cancellation of projects funded by CMAQ in the emissions reduction reporting. In particular, this commenter asked about procedures for removing the emissions reductions already accounted for in previous reporting to ensure that emission reduction credit is not taken for a project that continues to get slipped and carried over from one year to the next.

The FHWA agrees that flexibility should be provided to areas if their designations change during the 4-year performance period. The FHWA has revised the language in § 490.809(c) so that nonattainment and maintenance areas will be revised if an area is no longer nonattainment or maintenance, for any pollutants in § 490.803.

10. Concerns About the CMAQ Public Access System Data; Use of Observed Data and Other Alternative Methods

Some commenters expressed concerns with data deficiencies in the CMAQ Public Access System that should be corrected before reliance on its use for the on-road mobile source emissions performance measure. For example, AASHTO and Connecticut DOT commented that the inability to de-obligate an entry was a deficiency in the User Profile and Access Control System (UPACS) that needs to be corrected to meet the requirements of the on-road mobile source emissions performance measure. The AASHTO, Oregon DOT, and Connecticut DOT expressed concern that emissions reductions often are estimated differently by different MPOs and that sometimes even similar projects within an agency have vastly different estimates. The Chicago Metropolitan Agency for Planning warned that it will be difficult to ensure data quality submitted for performance reports because projects in the database have not matched up well with local project descriptions, which is in part a result of the local programmer (often the MPO) submitting data to the State, which then repackages it for submission to the Public Access System. Others commented that because the UPACS/ Public Access System is intended to track emissions reductions benefits, it is not well suited to evaluate attainment of targets. One commenter noted that adding health impact information for each pollutant would be useful to decisionmakers. Another recommended that FHWA provide a workbook to input

more environmental information into the CMAQ Public Access System (e.g., population density, traffic congestion, extreme weather events). The Pennsylvania DOT recommended that the emission reduction performance measure should be based on cost-effectiveness.

Several commenters sought clarification on various issues related to calculating emissions reductions for purposes of the proposed on-road mobile source emissions performance measure, and various alternative methods or improvements to the UPACS/CMAQ Public Access System were suggested.

The Oregon Metro Council and the Joint Policy Advisory Committee on Transportation expressed concern that the proposed on-road mobile source emissions performance measure does not meet the same standards as other performance measures because it is not based on observed data.

The Oregon DOT and Washington State DOT commented that collecting emissions data on a project-by-project basis through vehicle probing or other means would be cost-prohibitive and take years to collect enough data to use. Others recommended that FHWA create a look-up table that it would update periodically and which lists emission reductions that may be expected for a range of smaller projects. Similarly, Oregon DOT suggested that FHWA consider ways to quantify some projects that nationwide tend to have missing data.

While FHWA is aware that this measure is based on estimated emissions reduction, not measured or observed emissions, the tools to do otherwise are not available, and the time needed to measure the change in emissions from every CMAQ project would be not be practicable. State DOTs and MPOs have been strongly encouraged to quantitatively report their emission benefits for all CMAQ projects since 1992. The first modules of FHWA's tool kit of best practices are already available, and additional modules now under development will be available before the first performance period. No changes were made in response to these comments.

11. Applicability of Measure to All Criteria Pollutants and Precursors

The United States Green Building Council commented that MPOS should be required to measure the criteria air pollution of their plans and subsequently work to reduce criteria pollutant levels. Another suggested that the on-road mobile source emissions performance measure should allow

States and MPOs to include emissions reductions from CMAQ projects for all criteria pollutants (and their precursors), regardless of the type of attainment/nonattainment areas in which the project is located. This commenter reasoned that it may be difficult to separate out reductions that only pertain to the specific nonattainment and maintenance areas, particularly for regional or statewide CMAQ projects.

Several commented that no other non-CMAQ pollutants should be added to the on-road mobile source emissions performance measure. Specifically, Oregon DOT recommended that FHWA limit defined pollutants and not include open ended definitions that have the potential to expand performance measure burdens under this rule due to actions by another agency. The Connecticut DOT commented that subpart H performance targets only should be set for criteria pollutants for which a State currently reports emissions reductions.

The FHWA agrees that it is not always easy to determine the emissions benefits for some projects by nonattainment or maintenance area. However, to the extent an area wants to take credit for the emissions reductions for a statewide project, they should use the best tools available to determine which portion of that project benefits their area. This problem is not new to the CMAQ program or even regional emissions analyses under transportation conformity that must account for the emissions of all projects within a nonattainment or maintenance area. Therefore, FHWA has not made any changes in the final rule based on this comment.

12. Use of Standard System Versus Metric System To Measure Emissions

The AASHTO and Connecticut DOT recommended that FHWA change the protocol for the CMAQ Public Access System from the metric system (kg/day) to standard (lbs/day) for consistency to life of the project cost effectiveness. Others recommended that emission reduction benefits be compared in tons per annualized days to allow a fair comparison between projects that may have a varied number of effective days. The Association of Metropolitan Planning Organizations commented that converting the kilograms per day emissions data to tons per year does not provide any new information about the performance of the project or how it compares to other projects. Rather than having the measure be expressed in short tons per year, one commenter suggested that the measure should be

expressed in total number of short tons of pollutant removed over the 2- and 4-year periods. This commenter also recommended that the equation given in section 490.813(b) should be modified to add a parameter for the number of years or the regulation should provide an additional equation for the 4-year calculation.

The FHWA agrees with the concerns raised about the proposed metric and therefore has removed that conversion from the emissions measure calculation in section 490.813(b). This change also results in a change in the units for the emissions measure in section 490.813.

VI. Section-by-Section Discussion of the General Information and National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program

A. Subpart A—General Information

Discussion Section of § 490.101 Definitions

The FHWA made the following changes and additions to the definitions proposed in the NPRM.

American Community Survey (ACS)—A definition was added to describe a data source that is needed to support new required measure components. The ACS is being identified as a source of information to acquire data on travel choices to journey to work in urban areas.

Freight bottlenecks—The definition of “freight bottleneck” has been changed to “truck freight bottleneck” and revised to provide a general description that allows State DOTs to determine based upon individual context. The definition also does not limit the location to the Interstate. Each State will need to define what constitutes bottlenecks based upon the specific context of the State and the local impediments that each State experiences with regard to freight movement.

Maintenance area—FHWA has amended the definition of maintenance area to exclude areas that reach the end of their 20-year maintenance period for the purposes of part 490.

National Performance Management Research Data Set (NPMRDS)—the definition of the NPMRDS was revised to clarify that only mainline highway portions of the NHS are included in the data set. In addition, the definition was revised to change the interval of travel times from 5 to 15 minutes.

Non-SOV Travel—a definition was added for travel occurring on modes other than driving alone in a motorized

vehicle and includes travel that is avoided by telecommuting. This definition was added as the term, “non-SOV Travel,” is used within the regulatory text as an indicator of transportation mode choice.

Discussion Section of § 490.103 Data Requirements

The FHWA made the following changes regarding Data Requirements.

Throughout the final rule the timing for determination of measure applicability has been changed from “at the time when the State Baseline Performance Period Report is due” to “one year before the time when the State Baseline Performance Period Report is due.” In § 490.103(c), State DOTs must use the nonattainment and maintenance boundaries based on the most recent EPA designations at the time that is “one year before” the State Baseline Performance Report is due. As discussed in the change to the definition of “maintenance” areas, EPA designations of maintenance areas that have reached the end of their 20-year maintenance period will not be applicable to the requirements of subpart H.

The FHWA revised the equivalent data requirements under section 490.103(e)(5)(ii) to clarify that the equivalent data set only is required to include travel time data for the “mainline highways” on the NHS. In addition, § 490.103(e)(5)(ii) was revised to include travel times at a maximum of 15 minute intervals. The temporal granularity of the average travel times in the equivalent data was reduced from the proposed 5 minute interval level to 15 minutes.

In section 490.103(e)(5)(iii), for equivalent data sets, travel must be observed and may be derived from travel times over longer time periods (known as path processing or equivalent).

Text was added in § 490.103(f)(1) to clarify that it is acceptable to use the NPMRDS Travel Time Segments as the Reporting Segments by stating that it is optional to create new Reporting Segments.

The FHWA revised § 490.103(f)(2) to increase the maximum length of reporting segments in urban areas from ½ mile to 1 mile (unless an individual Travel Time segment is longer).

In § 490.103(g) of the NPRM, FHWA proposed that the State DOT would submit its reporting segments for the NHS and the desired travel times for applicable⁶⁷ reporting segments to

HPMS no later than November 1, prior to the beginning of the calendar year in which they will be used for travel time data collection. The FHWA also proposed that these reported reporting segments would be used throughout the performance period. The FHWA felt that a 2-step data reporting (first step is reporting segments and desired travel times and second step is reporting metric data for corresponding reporting segments) along with constant reporting segments throughout the performance period is necessary to ensure consistency between data sets at the time of target establishment and subsequent progress evaluations. Since this final rule removes the proposed Peak Hour Travel Time measures in section 490.507, travel time data sets could change (NPMRDS to/from an equivalent data set) during a performance period, and removing the requirements to maintain constant NHS limits during a performance period in section 490.105(d)(3), FHWA believes the first step of data reporting unnecessary. Accordingly, FHWA removes, in the final rule, the proposed reporting requirement for reporting segments and desired travel times prior to the beginning of the calendar year in which they will be used for travel time data collection in § 490.103(g). The FHWA believes that eliminating this reporting step will reduce the burden on the State DOTs. As a result, FHWA moves the requirement for documentation of the State DOT and applicable MPOs coordination and agreement on the travel time data set in § 490.103(g)(4) in the NPRM to § 490.103(f)(4) in the final rule. The FHWA also moves the requirement for the reporting segments in an equivalent data be referenced by HPMS location referencing standards in § 490.103(g)(5) in the NPRM to § 490.103(e)(5)(i) in the final rule.

Section 490.103(g) has been revised in this final rule. In this section, State DOTs are encouraged to report the Posted Speed Limits for the full extent of the NHS via HPMS as this data is needed for State DOTs to identify the occurrence of excessive delays.

Discussion Section of § 490.105 Establishment of Performance Targets

Section 490.105(d)(3) and (e)(3)(i)—**Maintaining Urbanized Area Constant Throughout a Performance Period**

In section 490.105(d)(3), FHWA removes the requirement for maintaining urbanized area constant throughout a performance period. The FHWA made this change because the requirements for NHS limits constant

⁶⁷ Reporting segments on NHS located within urbanized areas with populations over 1 million for the proposed Peak Hour Travel Time measures.

throughout a performance period was eliminated in the final rule for the second performance management measures. In addition to consistency between NHS limits data and urbanized area data, FHWA believes State DOTs and MPOs will have sufficient time to adopt updated U.S. Census decennial census data in their target establishment/adjustment since the NHS and urbanized area data used for travel time data collection for a calendar year will have a 2-year time lag. For example, 2015 NHS limits and urbanized area data collected is reported in 2016 to HPMS and that data will be used for travel time data collection in 2017. Additionally, HPMS allows 2 years to adopt updated decennial census urbanized area data. So, FHWA believes that there will be adequate time between U.S. Census publications of decennial census urbanized area data and target establishment and adjustment. For these reasons, FHWA revises § 490.105(d)(3) for removing the requirement for maintaining urbanized area constant throughout a performance period for the urbanized area specific targets, as provided in § 490.105(e)(8). For the same reason, the FHWA revises § 490.105(e)(3)(i) so that State DOTs no longer required to “declare” the boundaries used to establish each additional target and so that changes in urbanized area will be accounted for the additional targets, as described in § 490.105(e)(3).

Section 490.105(e)(8)(i) and (ii) and (f)(5)(i) and (ii)—Urbanized Area Population Threshold for CMAQ Traffic Congestion Measures

In section 490.703, FHWA revises the urbanized area population threshold for traffic congestion measures, in § 490.707(a) and (b), from 1 million to 200,000. In response to the revision in section 490.703, FHWA revises § 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii). In § 490.105(e)(8)(i) and (f)(5)(i), the 1 million population threshold only applies to the first performance period (*i.e.*, the performance period beginning on January 1, 2018). In § 490.105(e)(8)(ii) and (f)(5)(ii), the 200,000 population threshold applies to the second performance period (*i.e.*, the performance period beginning on January 1, 2022) and all subsequent performance periods thereafter.

Sections 490.105(e)(8)(iii), (f)(5)(iii), and (f)(6)(iii), and 490.107(c)(3)—Population Data Sources for CMAQ Measure Applicability Determination

Total population of an urbanized area in section 490.713(b) in the final rule is

revised from the Decennial Census population number to the most recent annual population estimate from the U.S. Census Bureau. Section 490.105(e)(8)(iii)(D) and (f)(5)(iii)(D) have been revised so that the data source for applicability determination and the measure computation are the same.

To maintain consistency with the population data source for determining the applicability of the CMAQ traffic congestion measures, FHWA revises sections 490.105(f)(6)(iii) and 490.107(c)(3) to use the most recent annual population estimates from the U.S. Census Bureau in determining which MPOs are required to submit MPO CMAQ Performance Plan.

Section 490.105(e)(8) & (9) and (f)(5) & (6)—CMAQ Measure Applicability Determination Timing and Methodology

In paragraphs (e)(8)(iii)(D) through (F), (e)(8)(iv), (f)(5)(iii)(D) through (F) and (f)(5)(iv), FHWA revises the timing of determining which State DOTs and MPOs are required to implement traffic congestion measures in § 490.707(a) and (b). The applicability determination for traffic congestion measures will be made 1 year before when the State DOT Baseline Performance Period Report.

In paragraphs (e)(9)(v) and (f)(5)(v), FHWA revises the timing of determining which State DOTs and MPOs are required to implement on-road mobile source emissions measure in § 490.807. The applicability determination for on-road mobile source emissions measure will be made 1 year before when the State DOT Baseline Performance Period Report.

In paragraphs (e)(8)(iii)(F), (e)(8)(v), (f)(5)(iii)(F), and (f)(5)(v) of this section, FHWA revises the requirements for the determination of nonattainment and maintenance areas to revisit the designations one year before the State DOT Mid Performance Period Progress Report is due to FHWA. Any urbanized areas that are determined at this point to be no longer in nonattainment or maintenance for a criteria pollutant included in section 490.703 will not be subject to the traffic congestion measure requirements for the remainder of the performance period.

In paragraphs (e)(9)(v), (e)(9)(viii), and (f)(6)(v) of this section, FHWA revises the requirements for the determination of nonattainment and maintenance areas to revisit the designations one year before the State DOT Mid Performance Period Progress Report is due to FHWA. Any area within State boundary or metropolitan planning area that are determined at this point to be no longer in nonattainment or maintenance for

any criteria pollutant included in section 490.803 will not be subject to the on-road mobile source emission measure requirements for the remainder of the performance period.

In paragraphs (e)(8)(vi) and (f)(5)(vi) of this section, FHWA revises the phase-in for the establishment of urbanized area specific targets. The phase-in does not require State DOTs and MPOs to establish a 2-year target for the first performance period to provide time to build capacity and to acquire sufficient to calculate the new PHED measure in § 490.707(a). The phase-in of urbanized area specific targets does not apply to the new non-SOV travel measure in § 490.707(b).

Discussion Section of § 490.107 Reporting on Performance Targets Section 490.107(a)(4)—Initial State Performance Report

Section 490.107(a)(4) and (5) have been removed in this final rule.

Section 490.107(b)(1)(ii)(E)—NHS Limits for Targets

The NHS limits for targets are removed from section 490.107(b)(1)(ii)(E) and State are not required to include them in the State Baseline Performance Period Report. This requirement was removed as NHS limits will not be held constant for the duration of the performance period in the assessment of progress made by State DOTs to achieve targets. As discussed in the Pavement and Bridge Condition Performance Measure final rule, commenters felt that changes in NHS limits that may occur from year to year can be reasonably considered in the establishment of targets.

Section 490.107(b)(1)(ii)(E), (b)(2)(ii)(D), and (b)(3)(ii)(D)—Reporting Congestion at Truck Freight Bottlenecks

Section 490.107(b)(1)(ii)(E), (b)(2)(ii)(D), and (b)(3)(ii)(D) have been revised to clarify that States must document the location of freight bottlenecks with the State including those identified in the National Strategic Freight Plan. The section also sets forth the conditions under which a State Freight Plan may serve as the basis for identifying truck freight bottlenecks.

Section 490.107(b)(1), (2) and (3)—Reporting Metrics for GHG Measure

As discussed in the discussion section for § 490.511, State DOTs are required to report total annual on-road CO₂ emissions on the NHS and total annual on-road CO₂ emissions, for the measure specified in § 490.507(b), to FHWA as part of the State Biennial Performance Report. Accordingly, FHWA adds

§ 490.107(b)(1)(ii)(H), (b)(2)(ii)(J), and (b)(3)(ii)(I) in the final rule.

Section 490.107(b)(1)—Reporting Data Collection Method for the Percent Non-SOV Travel Measure

As discussed in discussion section for § 490.709, State DOTs are required to report in their Baseline Performance Period Report the data collection method that is used to determine the Percent non-SOV Travel measure, in section 490.707(b), for each applicable urbanized area in the State, as provided in section 490.709(f)(2). Accordingly, FHWA adds § 490.107(b)(1)(ii)(I) in the final rule.

Section 490.107(c)(3)—MPO CMAQ Performance Plan Applicability Determination Timing

In § 490.107(c)(3), FHWA revises the timing of determining which MPOs are required to develop and report CMAQ Performance Plan. The applicability determination for the MPO CMAQ Performance Plan will be made 1 year before when the State DOT Baseline Performance Period Report. Also, FHWA revises § 490.107(c)(3) so that nonattainment and maintenance areas to revisit the designations one year before the State DOT Mid Performance Period Progress Report is due to FHWA. Any area within metropolitan planning area, within an urbanized area with a population greater than 1 million, that are determined at this point to be no longer in nonattainment or maintenance for any criteria pollutant included in section 490.803 will not be subject to the MPO CMAQ Performance Plan for the remainder of that performance period.

B. Subpart E—National Performance Management Measures for the NHPP System Performance

Discussion Section 490.503 Applicability

The FHWA removed the applicability language relating to Peak Hour Travel Time measures because those measures have been removed from the rule. The FHWA added a provision for the GHG measure in § 490.507(b), making it applicable to all mainline highways on the Interstate and non-Interstate NHS.

Discussion Section of § 490.505 Definitions

The following changes were made to the definitions in section 490.505 to address comments received.

A definition has been established to define Greenhouse Gas as any gas that

absorbs infrared radiation in the atmosphere. The definition further notes that ninety-five percent of transportation GHG emissions are carbon dioxide (CO₂) from burning fossil fuel. Other transportation GHG emissions are methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFCs). The definition also establishes the acronym, “GHG,” that is used throughout the section to refer to Greenhouse Gas. This definition has been added as a GHG measure is established in this section to assess system performance.

The proposed definitions for Desired Peak Hour Travel Time, Peak Hour Travel Time, The Peak Period, and Peak Hour Travel Time Ratio were all removed from section as the measure of the percentage of the system meeting peak hour travel time expectations has been removed.

Discussion Section of § 490.507 National Performance Management Measures for System Performance

The NHPP Reliability measure has been changed from, “Percent of the Interstate System providing for Reliable Travel Times,” to “Percent of person-miles travelled on the Interstate System that are reliable.” This same change has been made for the non-Interstate NHS reliability measure. The proposed Peak Hour Travel Time measures were removed in the final rule.

The FHWA added a GHG emissions performance measure in this section. The FHWA established the measure in a manner that utilizes existing data sources and minimizes burden on transportation agencies.

The GHG emissions performance metric is on-road CO₂ emissions from vehicles operating on the NHS. The measure will be expressed as a percent change in CO₂ from a reference year of 2017 levels in order to provide more meaning and context to decisionmakers and the public than a measure using a certain number of metric tons of CO₂.

Discussion Section of § 490.509 Data Requirements

Section 490.509(a) Through (e)—Data Requirement for the Reliability Measures

The FHWA removed the proposed requirement to replace missing travel times with travel time at posted speed limit for the NHPP Reliability measures and all other travel time derived measures in part 490. After further analysis of data and consideration of

comments received, it was determined that, in cases where a considerable portion of the data was missing, the addition of the imputed travel times inaccurately skewed the measure results. In addition, FHWA believes that the occurrence of missing data will be reduced due to the greater prevalence of probes in the future, the allowance of path processing techniques to identify travel times, and the decreased temporal granularity of the measurements from 5 minutes to 15 minutes.

In addition, FHWA has added paragraph (e) in this section to allow State DOTs to exclude any travel times that may have been collected while the roadway was closed.

The FHWA added requirements to identify the data sources for both average annual daily traffic (AADT) volumes and average occupancy factors to support the data needs to adjust the NHPP Reliability measures to reflect person-miles of travel on the NHS. The HPMS has been identified as the data source for segment AADT, which is used to represent a full year of traffic volume by multiplying the average daily value by 365. Average occupancy factors will be determined and published by FHWA on its Web site from national surveys focused on household travel. The FHWA anticipates using the National Household Travel Survey (NHTS) to develop these factors for every State and large metropolitan areas. State DOTs, MPOs, and FHWA will be able to use the combination of total annual traffic volume, average occupancy factors, and length of reporting segment to weight the associated impact of reliability performance on all people traveling on the roadway annually.

Section 490.509(f) Through (h)—Data Requirements for the GHG Measure

The data requirements for calculating the CO₂ emissions performance measure are: (1) Emissions factors of CO₂ per gallon of motor fuel, (2) annual motor fuel sales volumes, and (3) vehicle miles of travel on the NHS and on all roads. Data sources for each are readily available.

The FHWA will post the applicable emissions factors annually by August 15 for use in calculating the performance measure for a range of fuels, based on U.S. Energy Information Agency (EIA) data.⁶⁸ Examples of emissions factors are listed below for informational purposes:

⁶⁸ U.S. Energy Information Agency, and <http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11>.

Fuel	Pounds CO ₂	Kilograms CO ₂
E10 (Gasoline with 10% ethanol)	18.95/gallon	8.59/gallon.
Gasoline	19.60/gallon	8.89/gallon.
Diesel	22.40/gallon	10.16/gallon.
Compressed Natural Gas (CNG)	54.60/McF (McF = 1,000 Cubic Feet)	24.76/McF (McF = 1,000 Cubic Feet).

State DOTs already collect information on fuel sales for motor vehicle fuels and report it to FHWA. In order to provide maximum flexibility and promote ease of use, State DOTs may use either of the following sources for annual motor fuel sales information:

1. Annual fuel sales volumes as posted August 15 for the previous year in FHWA's *Highway Statistics* in Table MF-21 "Motor Fuel Use."⁶⁹ Fuel sales are provided as a total number of gallons for combined gasoline/gasohol (gasoline ethanol blends such as E10), and special fuels (diesel, biodiesel, natural gas, etc.) combined. According to EIA, 95 percent of current gasoline sales are of E10 (ten percent blend of ethanol with gasoline).⁷⁰

2. The State DOT's fuel sales data the State DOT used to create the summary data included in FHWA's MF-21, if it allows for a great level of detail by fuel type. The FHWA encourages States to track sales at a more granular level and to use the appropriate emissions factor posted by FHWA for each sub-fuel. State DOTs shall make this data available to FHWA, upon request.

Vehicle miles of travel on the NHS and on all roads by State are published in FHWA's *Highway Statistics* in Table VM-3 "Vehicle Miles of Travel, by Federal-Aid Highways." For consistency, the measure uses the most recent published annual data as of August 15 of the year in which the metric is being calculated. For example, State DOTs will access the most recent data on August 15, 2018, to calculate the annual CO₂ emissions on the NHS in 2017.

Discussion Section of § 490.511 Calculation of System Performance Metrics

Section 490.511(b) and (e)—Metric for Reliability Measures

The FHWA changed the basic time period for the travel time reliability measure from 5 minutes to 15 minutes. The FHWA also clarified that reporting segment-level reliability metrics and related data can be reported by either

⁶⁹ Note that the highway use fuel sales data in MF-21 includes only the fuel that is used to power on-road vehicles and does not include the fuel used for road construction or off-road activities such as powering lawn-mowers and construction equipment.

⁷⁰ www.eia.gov/todayinenergy/detail.php?id=26092.

NPMRDS TMC segment(s) or HPMS sections.

The FHWA added information to be reported to HPMS along with the metric-related information, including directional AADT (the AADT in the direction of travel for the reporting segment) and a vehicle occupancy factor if not using the FHWA-supplied factor.

Sections 490.511(c), (d), and (f)—Metric for the GHG Measure

State DOTs are required to calculate annual total tailpipe CO₂ emissions on the NHS as the metric for the GHG measure. To calculate the CO₂ emissions performance metric, State DOTs will use a methodology that relies on fuel sales volumes.

In order to calculate total annual on-road CO₂ emissions, the total volume of each fuel sold is multiplied by the appropriate CO₂ emission factors. The total CO₂ emissions for each fuel type are then summed. The CO₂ emissions measure is specific to the performance of the NHS. Therefore, it is necessary to estimate the portion of on-road CO₂ emissions attributable to the NHS by State.⁷¹ Existing data does not differentiate the exact volumes of fuel burned on the NHS versus the volume of fuels burned on other roads. Therefore, States will use the proportion of the State's VMT that occurs on the NHS as a proxy for the proportion of the State's on-road CO₂ emissions on the NHS.⁷² State DOTs calculate on-road CO₂ emissions on the NHS by multiplying on-road CO₂ emissions by the proportion of NHS VMT out of total VMT.

As fuel sales volumes are not generally available at the metropolitan area level, State DOTs and MPOs have flexibility on how they calculate on-road CO₂ emissions for MPOs. Options range from simply using the MPO share of the State's VMT as a proxy for the MPO share of CO₂ emissions, to more

⁷¹ Travel on the NHS accounts for approximately 55 percent of total U.S. VMT, varying by State.

⁷² FHWA recognizes that this is not a perfect proxy, as speeds, operating conditions, and vehicle types on the NHS differ from those on other roads and differ between states. However, in balancing the competing goals of simplicity and precision, FHWA believes that this approach provides actionable information that DOTs and MPOs can use in evaluating system performance and making decisions, without significantly increasing workloads.

detailed analytical methods, such as using travel demand modeling and EPA's MOVES model,⁷³ or using FHWA's EERPAT model. These methods are discussed in detail under Section V. An MPO also may use another methodology if the methodology is demonstrably valid and useful for CO₂ measurement. The use of a methodology not described in the rule does not require FHWA approval, but is subject to oversight.

State DOTs will report total annual on-road CO₂ emissions on the NHS (the GHG metric) and total annual on-road CO₂ emissions (the step in the calculation prior to computing the GHG metric) to FHWA as part of the State Biennial Performance Report. State DOTs will report the 2017 on-road CO₂ emissions on the NHS in the first Biennial Performance Report. State DOTs will use the 2017 reference value calculated for the first Biennial Performance Report in future Biennial Performance Reports unless FHWA posts on its Web site that there has been a change that warrants recalculation of the 2017 value, in which case the State DOT will provide an updated value in the next Biennial Performance Report. State DOTs will report the GHG metric and total annual CO₂ emissions, every 2 years in their Biennial Performance Report for each of the preceding 2 calendar years. In doing this, the State DOT can either acquire the data needed for both years at once to calculate the metric, or they can calculate the metric each year. In either case, the State DOT will report both years to FHWA at one time in their Biennial Performance Report.

Discussion Section of § 490.513 Calculation of System Performance Measures

Section 490.513(a) has been revised to more clearly identify that State DOTs and MPOs will calculate measures in this section for the purpose of carrying out the system performance related performance requirements of part 490 and that FHWA will calculate measures in this section for the purpose of making significant progress determinations and for reporting on system performance.

⁷³ Or EMFAC in California.

Section 490.513(a) Through (c)— Calculation of Reliability Measures

Section 490.513 has been revised to change the measure calculation method to add in weighting for person-miles traveled. The NHPP Reliability measure is calculated by summing the product of the total annual traffic volume, the average occupancy factor, and the segment length for each reporting segment that is exhibiting a LOTTR below 1.50 and comparing this, as a percentage, to the total person-miles traveled on the full system. This method has been designed to accommodate unique occupancy factors for each reporting segment if this information is available through data tables provided by FHWA as discussed in section 490.509.

Section 490.513(d)—Calculation of the GHG Measure

Total annual tons of CO₂ emissions from on-road transportation sources on the NHS are expressed as a percent change from 2017, computed to the nearest tenth of a percent. This is in accordance with common practice of expressing GHG emissions goals in terms of a percent change from a certain year.

C. Subpart F—National Performance Management Measures for Freight Movement on the Interstate

Discussion of Section 490.607 National Performance Management Measure To Assess Freight Movement on the Interstate System

The FHWA has eliminated the performance measure for Percent of Interstate System Mileage Uncongested. The final and sole performance measure for freight will be Truck Travel Time Reliability Index, which represents the average reliability index of all reporting segments on the Interstate system.

Discussion of Section 490.609 Data Requirements

Consistent with changes to sections 490.509 and 490.511(b), FHWA has revised the time bin intervals in this section from 5 to 15 minutes. This rule also revises the approach to missing data, adopting a requirement that when truck travel times are not available in the travel time data set (data not reported, or reported as “0” or null) for a given 15 minute interval, the missing travel time will be replaced with an observed travel time that represents all traffic on the roadway during the same 15 minute interval (“all vehicles” in NPMRDS nomenclature). Changes were also made to the method to replace missing truck travel times to remove the

requirement to only allow all vehicle travel times to be used as a replacement for truck travel times when this time was less than or equal to the posted speed limit. The FHWA also added a provision allowing State DOTs to exclude time periods when an NHS roadway is closed.

Discussion of Section 490.611 Calculation of Freight Movement Metric

First, as discussed in section 490.607, the Percent of the Interstate System Mileage providing for Reliable Truck Travel Time proposed in the NPRM has been renamed the Truck Travel Time Reliability (TTTR) Index. Second, the TTTR Index has been revised in several ways.

The TTTR Index measure now includes five time period components to better consider the variability in travel times experienced by trucks during all hours of the day and throughout the year. These time periods were selected to be consistent with the time periods used to calculate the LOTTR as proposed in the NPRM and finalized in section 490.511. As discussed in §§ 490.511 and 490.611, FHWA revised the data bins to use 15-minute intervals. The TTTR Index metrics are calculated as the ratio of the 95th percentile travel time divided by the 50th percentile travel time for each segment and each time period.

The reporting of the metric has been revised to require the reporting of the TTTR Index, the 95th percentile travel time, and the 50th percentile travel time for each of the five time periods for each reporting segment.

Discussion of Section 490.613 Calculation of Freight Movement Measure

Section 490.613(a) has been revised to more clearly identify that State DOTs and MPOs will calculate measures in this section for the purpose of carrying out the freight related performance requirements of part 490 and that FHWA will calculate measures in this section for the purpose of making significant progress determinations and for reporting on freight performance.

The method for calculating the freight performance measure has been changed from the proposed Percent of the Interstate System Mileage Providing for Reliable Truck Travel Times to a TTTR Index for the five time periods noted in § 490.611. Instead of using a threshold for determining if a section of Interstate is reliable, as proposed in the NPRM, an index is calculated and averaged for the entire Interstate in the State. The average TTTR Index is calculated by multiplying the maximum TTTR Index

metric of all 5 time periods for each reporting segment by the length of the reporting segment, then the sum of all segments is divided by the total length of Interstate to generate an average TTTR Index for the entire applicable area. This approach to calculating the measure will differentiate it from the NHPP Travel Time Reliability measure, and remove the expectation to maintain a TTTR below 1.50 to better recognize incremental improvements to system performance.

D. Subpart G—National Performance Measures for CMAQ Program—Traffic Congestion

Discussion Section of § 490.703 Applicability

The FHWA has decided to phase-in this expansion of the applicability of the CMAQ Traffic Congestion measures to medium-sized urbanized areas, recognizing that calculating the Peak Hour Excessive Delay (PHED) measure may be burdensome in the short term for some smaller urbanized areas in light of other new performance measure requirements.

The CMAQ Traffic Congestion measures of PHED and Modal Share focus on addressing traffic congestion that contributes to air pollution in areas classified as in nonattainment or maintenance under the Clean Air Act. The final rule revises §§ 490.703 and 490.105(e)(8)(i), (e)(8)(ii), (f)(5)(i), and (f)(5)(ii) so that the CMAQ Traffic Congestion measures in section 490.707 initially apply to the urbanized area with a population of more than 1 million that contains any part of nonattainment or maintenance areas, before expanding to nonattainment or maintenance areas with a population over 200,000 for the second and all subsequent performance periods.

The FHWA also revised section 490.703 to base the applicability on urbanized area attributes (existence of NHS mileage, population, and attainment status). The proposed section in the NPRM applied the measure to the NHS. This was changed because the new non-SOV travel measure applies beyond the NHS.

Discussion Section of § 490.705 Definitions

The FHWA limits the excessive delay measure to peak hours, which are revised from the peak hours in the Peak Hour Travel Time Reliability measure in the NPRM. The peak periods in the final rule include 9:00 to 10:00 a.m. and to provide flexibility to State DOTs and MPOs to add a fourth hour (either 3:00 to 4:00 p.m. or 7:00 to 8:00 p.m.) for the

afternoon peak period. The FHWA provides flexibility only within the 6:00 a.m. to 8:00 p.m. time period to be consistent with the dataset used in the reliability measure under section 490.103.

FHWA revises the speed threshold in the final rule to be 60 percent of the posted speed limit with a minimum of 20 mph.

Discussion Section of § 490.707 National Performance Management Measures for Traffic Congestion

In the NPRM, FHWA proposed excessive delay per capita as the measure of traffic congestion under CMAQ. This measure has been revised as described in section 490.705 to reflect the total peak hour excessive delay experienced by all travelers, normalized by the total population in the applicable area. In this final rule, the revised measure is peak hour excessive delay per capita.

The FHWA revised section 490.707 in the final rule to include a new measure under the CMAQ program that reflects the percentage of non-single occupancy vehicle trips taken by travelers within an urbanized area. This measure will help State DOTs and MPOs better understand the impact of lower-emission travel methods on their congestion profile and area air quality.

Discussion Section of § 490.709 Data Requirements

Discussion Section 490.709(a) Through (e)—Data Requirements for the Annual Hours of Peak Hour Excessive Delay Per Capita Measure

The FHWA retained the data requirements to determine hourly traffic volumes proposed in the NPRM and added a new allowance in section 490.709(c)(5) for travel times that represent periods when the roadway is closed.

The FHWA added § 490.709(d) and (e) in the final rule to establish the data needed to estimate the impact of travel time delay on all travelers. The method is used to group roadway traffic on the NHS into three types of vehicles, including: Trucks, buses, and cars and then estimates the total number people traveling by applying occupancy factors for these vehicles, respectively.

Section 490.709(d) has been established to specify the allowable methods to determine the volume of buses, trucks, and cars as a percentage of daily traffic using each roadway segment. Two methods are specified that provide State DOTs the option of determining the percentage of the three vehicle groups based on annual traffic

volume counts collected by continuous count stations or by using the average annual counts provided in the HPMS for each segment. State DOTs are required to distribute the traffic volumes to different directions of roadway when using the HPMS data to estimate volumes.

Section 490.709(e) has been established to specify the allowable methods to determine vehicle occupancy factors for buses, trucks, and cars. State DOTs have the option to use occupancy factors provided by FHWA and/or develop occupancy factors that are more specific than those provided by FHWA. The latter will be useful when specific strategies are used to increase person throughput (*e.g.*, construction of high occupancy lanes, dedicated bus lanes, ride sharing). The FHWA intends to develop default occupancy factors for each applicable urbanized area using bus ridership data provided in the NTD and car occupancy rates derived from national travel surveys, such as the NHTS and ACS. A default occupancy factor of 1.0 will be used for trucks. The FHWA intends to update these occupancy factors on a routine basis. To supplement the default occupancy factors, State DOTs and MPOs are provided the option to develop occupancy factors for sections of NHS roads where more specific data on vehicle occupancy is available. This option will be useful when specific strategies are used to increase person throughput such as the construction of high occupancy lanes, dedicated bus lanes, and ride sharing.

Discussion Section 490.709(f)—Data Requirements for the Percentage of Non-SOV Travelled Measure

The FHWA revises section 490.709(f) in the final rule to include data requirements for the measure of non-SOV mode share. The FHWA provides State DOTs and MPOs with several data options for calculating this measure. One option is to use Table DP03 of the ACS for the urban area to estimate the total percent of non-SOV commuting to work travel in the urbanized area. A second option is for State DOTs or MPOs to use local surveys to estimate the percentage of non-SOV travel occurring in the urbanized areas. These surveys may focus on either household or work travel and must be conducted within the 2 years before the start of the performance period and be updated on at least a biennial frequency. A third option is for State DOTs and MPOs to estimate the percent of non-SOV travel based on volume measurements of actual use of each transportation mode, including but not limited to cars,

bicycles, pedestrian travel, travel avoided by telework, and on-road bus transit. Use or development of the third option is encouraged by FHWA as it will provide the most accurate data for future use. State DOTs and MPOs have flexibility to determine which of these count methodologies to use and are required to report these methodologies to FHWA. State DOTs are also encouraged to report these use counts to currently available national data sources, including the Travel Monitoring Analysis System (TMAS).

The FHWA revises section 490.709(g) that determines which State DOTs and MPOs are required to implement both CMAQ traffic congestion measures in § 490.707(a) and (b). This determination will be based on the most recent annual populations published by the U.S. Census of urbanized areas available 1 year before the State DOT Baseline Performance Period Report is due to FHWA. As a result of this revision, § 490.105(e)(8)(iii)(D) and (f)(5)(iii)(D) are revised in the final rule. As for computing the Annual Hours of Peak Hour Excessive Delay Per Capita in section 490.713(b), FHWA revises section 490.709(g) to state that the most recent annual population reported by the U.S. Census, at the time when the State DOT Biennial Performance Period is due to FHWA.

Discussion Section 490.709(h)—Population and Nonattainment and Maintenance Area Data Requirements for Both Traffic Congestion Measures

The FHWA revises section 490.709(h) in the final rule to be consistent with the revised section 490.807(c), which includes the language that nonattainment and maintenance areas will be revised if changes to the designations made by EPA are effective 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA. As discussed in section 490.101 maintenance areas that have reached the end of their 20-year maintenance period will not be subject to the requirements of this subpart.

Discussion Section of § 490.711
Calculation of Traffic Congestion
Metrics

The FHWA revised the metric for the Peak Hour Excessive Delay per capita measure to be a reflection of person hours of delay instead of vehicle hours of delay as proposed in the NPRM. The new metric, Total Peak Hour Excessive Delay (person-hours), is calculated for each reporting segment and reported annually to FHWA. There is no metric required for the Percent non-SOV travel

measure as segment level data is not available for this measure.

The FHWA revises section 490.711(b)(1) for the peak period to include 9:00 to 10:00 a.m. and to provide flexibility to State DOTs and MPOs to add a fourth hour (either 3:00 to 4:00 p.m. or 7:00 to 8:00 p.m.) for the afternoon peak period consistent with the changes made to section 490.705. The FHWA provides flexibility within the 6:00 a.m. to 8:00 p.m. time period to be consistent with the dataset used in the reliability measure under § 490.103.

The FHWA changed the length of the NPRMDS time bins from 5 minutes to 15 minutes. This also changed the maximum travel time segment delay from 300 seconds to 900 seconds. The hourly volume is thus divided by four instead of 12.

The FHWA revised section 490.711(e) to express the PHED in person-hours of delay by incorporating average vehicle occupancy (AVO) into the calculation of the delay metric. To incorporate AVO into the metric, State DOTs will refer to either the AVO information for cars, buses, and trucks provided by FHWA or their own AVO information along with information about the percentage of cars, buses, and trucks as a share of total AADT to calculate a weighted AVO. This weighted AVO will then be multiplied by the vehicle-hours of excessive delay to establish the total person-hours of excessive delay. The FHWA recognizes the variations in AVO among and within urbanized areas and the challenges in obtaining segment-level AVOs. The FHWA will provide AVO for cars, trucks, and on-road bus transit for applicable urbanized areas. The FHWA also recognizes that urbanized areas may have more specific AVO data and thus, provides flexibility for State DOTs and MPOs to substitute these data.

Discussion Section of § 490.713 Calculation of Traffic Congestion Measures

Section 490.713(a) has been revised to more clearly identify that State DOTs and MPOs will calculate measures in this section for the purpose of carrying out the traffic congestion related performance requirements of part 490 and that FHWA will calculate measures in this section for the purpose of reporting on PHED performance.

The method to calculate the Excessive Delay per capita measure proposed in the NPRM has been retained in the final rule for the PHED per capita measure as the changes to limit to peak hours and account for all travelers are contained within the metric calculation discussed in the section 490.711. The measure is

calculated by summing the hours of excessive delay experienced by all travelers on all reporting segments by the most recent annual population estimate published by the U.S. Census for the applicable area.

The FHWA revises the final rule to include a measure of non-SOV mode share, providing flexibility for State DOTs and MPOs to choose between three options for calculating this measure. When employing the option using ACS data to calculate the percent non-SOV travel, State DOTs and MPOs calculate the measure by subtracting the estimated percent SOV from 100 percent. When employing the option using data derived from local surveys, State DOTs and MPOs will report the results of their calculations (as a percent of non-SOV travel). When employing the option using data derived from system use measurements to calculate percent non-SOV travel, State DOTs and MPOs will divide the non-SOV volume by total volume, where non-SOV volume includes travel modes other than driving alone in a motorized vehicle, including travel avoided by teleworking.

In addition, in recognition of expected improvements in the ability to accurately measure multimodal travel, FHWA plans to revisit this measure after the completion of FHWA's multimodal research study in Fall 2018.

E. Subpart H—National Performance Measure for the CMAQ Program—On Road Mobile Source Emissions

Discussion Section of § 490.803 Applicability

The performance measure is applicable to all States and MPOs with projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs for areas designated as nonattainment or maintenance for ozone (O₃), carbon monoxide (CO), or particulate matter (PM).

Discussion Section of § 490.805 Definitions

The proposed definitions of “donut area” and “isolated rural nonattainment and maintenance areas” were removed because those terms do not appear in the final regulation.

Discussion Section of § 490.809 Data Requirements

Section 490.809(c) was revised to specify that the baseline nonattainment and maintenance area designations should be based on area status one year before the date that the State DOT Baseline Performance Period Report is

due to FHWA, which means as of October 1, 2017, for the first State DOT Baseline Performance Period Report. The FHWA also revised the language in section 490.809(c) so that the nonattainment and maintenance areas will be revised if an area is no longer nonattainment or maintenance for any pollutant in section 490.803. This determination will be based on area status 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA.

Discussion Section of § 490.811 Calculation of Emissions Metric

Section 490.811 as proposed in the NPRM was removed in response to comments.

Discussion Section of Former § 490.813 Calculation of Emissions Measure

Section 490.813 in the NPRM has been renumbered as § 490.811 in the final rule, due to the deletion of proposed § 490.811 regarding an emissions metric. The section was also revised due to the removal of the emissions metric as that resulted in a change in the units for the emissions measure in this section.

VII. Rulemaking Analyses and Notices

The FHWA considered all comments received before the close of business on the comment closing date indicated above. The comments are available for examination in the docket FHWA–2013–0054 at www.regulations.gov.

A. Rulemaking Analysis and Notices Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures

The FHWA has determined that this action is a significant regulatory action within the meaning of Executive Order (E.O.) 12866 and within the meaning of DOT regulatory policies and procedures due to the significant public interest in regulations related to performance management. It is anticipated that the economic impact of this rulemaking will not be economically significant within the meaning of E.O. 12866 as discussed below. This action complies with E.O.s 12866 and 13563 to improve regulation. This action is considered significant because of widespread public interest in the transformation of the Federal-aid highway program to be performance-based, although it is not economically significant within the meaning of E.O. 12866. The FHWA is presenting an RIA (or regulatory impact analysis) in support of the final rule on Assessing Performance of the National Highway

System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program. The RIA evaluates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by E.O. 12866 and E.O. 13563. However, the RIA did not attempt to directly quantify the changes from the improved decisionmaking. The estimated costs are measured on an incremental basis, relative to current NHS performance, freight movement, and traffic congestion and emissions reporting practices.

The RIA estimated costs and benefits resulting from the final rule in order to inform policymakers and the public of its relative value. The complete RIA may be accessed from the docket (docket number FHWA–2013–0054).

The cornerstone of MAP–21’s highway program transformation is the transition to a performance-based program. In accordance with the law, State DOTs will invest resources in projects to achieve performance targets that make progress toward national goal

areas. The MAP–21 establishes national performance goals for system reliability, freight movement and economic vitality, and environmental sustainability.

This final rule establishes performance measures to assess the following: System performance on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP, freight movement on the Interstate, and traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program. The three NHPP-related measures are (1) Percent of person-miles traveled on reliable Interstate System roadways, (2) Percent of person-miles traveled on reliable non-Interstate NHS roadways, and (3) Percent Change in Tailpipe CO₂ Emissions on the NHS from the Calendar Year 2017. The performance measure to assess freight movement on the Interstate is Weighted Percent of the Interstate System Mileage providing for Reliable Truck Travel Times. The three measures to assess the CMAQ program includes two measures for traffic congestion: (1) Annual Hours of Peak-Hour Excessive Delay Per Capita and (2) Percent of non-Single

Occupancy Vehicle (SOV) Travel—and one measure to assess on-road mobile source emissions—Total Emission Reductions for applicable criteria pollutants or precursors.

Estimated Cost of the Final Rule

To estimate costs, FHWA assessed the level of effort, expressed in labor hours and categories, and the capital needed to comply with each component of the final rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Because there is some uncertainty regarding the availability of NPMRDS data for use by State DOTs and MPOs, FHWA estimated the cost of the final rule according to two scenarios. Under Scenario 1, FHWA assumes that it will provide State DOTs and MPOs with the required data from NPMRDS. Table 3 displays the total cost of the final rule under Scenario 1 for the 10-year study period (2017–2026). Total costs are estimated to be \$144.0 million undiscounted, \$106.4 million discounted at 7 percent, and \$125.5 million discounted at 3 percent.

TABLE 3—TOTAL COST OF THE FINAL RULE UNDER SCENARIO 1

Cost components	10-year total cost		
	Undiscounted	7%	3%
Section 490.103—Data Requirements	\$20,329,609	\$15,104,439	\$17,776,941
Intake and Process DOT Travel Time Data	15,325,924	11,094,661	13,258,812
NPMRDS Data Acquisition	3,600,000	2,606,093	3,114,444
NPRMDS Data Training	523,963	523,963	523,963
NPMRDS Data Reconciliation	879,722	879,722	879,722
Section 490.105–490.109—Reporting Requirements	90,533,557	67,705,203	79,346,012
Document and Submit Description of Coordination Between State DOTs and MPOs	2,547,274	2,547,274	2,547,274
Establish and Update Performance Targets	36,356,497	27,788,508	32,168,577
Reporting on Performance Targets Progress	35,446,842	25,738,285	30,683,726
Prepare CMAQ Performance Plan	14,887,674	10,810,080	12,887,165
Assess Significant Progress Toward Achieving Performance Targets	1,248,936	782,529	1,016,682
Adjust HPMS to Handle Data in TMC Format and Design Post-Submission Reports	26,182	24,469	25,420
Data Processing (e.g., Data Verification)	20,152	14,058	17,168
Section 490.511—Calculation of Performance Metrics for NHS Performance	5,681,474	4,088,067	4,902,708
Calculate LOTTR	2,711,510	1,938,066	2,333,323
Calculate Annual Total Tailpipe CO ₂ Emissions on the NHS	2,969,964	2,150,001	2,569,385
Section 490.513—Calculation of Performance Measures for NHS Performance	3,266,268	2,371,668	2,827,368
Calculate Interstate and Non-Interstate NHS Travel Time Reliability Performance Measures	3,186,603	2,313,822	2,758,408
Calculate Percent Change in Tailpipe CO ₂ Emissions on the NHS Compared to the Calendar Year 2017 Level Performance Measure	79,665	57,846	68,960
Section 490.611—Calculation of Freight Movement Metric	1,611,187	1,207,755	1,414,654
Calculate Truck Travel Time Reliability Index Metric	1,611,187	1,207,755	1,414,654
Section 490.613—Calculation of Freight Movement Measure	7,647,847	5,553,174	6,620,179
Calculate Truck Travel Time Reliability Index Performance Measure	7,647,847	5,553,174	6,620,179
Section 490.711—Calculation of Traffic Congestion Metric	6,227,101	4,357,789	5,308,381
Calculate Total Peak Hour Excessive Delay Metric	6,227,101	4,357,789	5,308,381
Section 490.713—Calculation of Traffic Congestion Measures	6,015,878	4,056,117	5,045,792
Calculate Annual Hours of Peak Hour Excessive Delay Performance Measure	5,917,257	3,989,623	4,963,074
Calculate Percent Non-SOV Travel Performance Measure	98,621	66,494	82,718
Section 490.813—Calculation of Emissions Measure	2,660,121	1,931,539	2,302,671
Calculate Total Emissions Reduction Performance Measure	2,660,121	1,931,539	2,302,671
Total Cost of Final Rule	143,973,042	106,375,750	125,544,706

* Totals may not sum due to rounding.

Under Scenario 2, which represents “worst case” conditions, State DOTs will choose to independently acquire the necessary data. Table 4 displays the total cost of the final rule under Scenario 2 for the 10-year study period (2017–2026). Total costs over 10 years are estimated to be \$205.5 million undiscounted, \$153.1 million discounted at 7 percent, and \$179.8 million at 3 percent.

TABLE 4—TOTAL COST OF THE FINAL RULE UNDER SCENARIO 2

Cost Components	10-year total cost		
	Undiscounted	7%	3%
Section 490.103—Data Requirements	\$81,838,250	\$61,852,128	\$72,074,370
Acquire Freight and General Traffic Data	51,000,000	38,327,684	44,809,156
Adjust Contract for Freight-only Data	9,000,000	6,763,709	7,907,498
Remove Estimated Data Values from Database	3,405,761	2,559,508	2,992,339
Intake and Process	17,028,804	12,797,542	14,961,693
Data Training	523,963	523,963	523,963
Data Reconciliation	879,722	879,722	879,722
Section 490.105–490.109—Reporting Requirements	90,533,557	67,705,203	79,346,012
Document and Submit Description of Coordination Between State DOTs and MPOs	2,547,274	2,547,274	2,547,274
Establish and Update Performance Targets	36,356,497	27,788,508	32,168,577
Reporting on Performance Targets Progress	35,446,842	25,738,285	30,683,726
Prepare CMAQ Performance Plan	14,887,674	10,810,080	12,887,165
Assess Significant Progress Toward Achieving Performance Targets	1,248,936	782,529	1,016,682
Adjust HPMS to Handle Data in TMC Format and Design Post-Submission Reports	26,182	24,469	25,420
Data Processing (e.g., Data Verification)	20,152	14,058	17,168
Section 490.511—Calculation of Performance Metrics for NHS Performance	5,681,474	4,088,067	4,902,708
Calculate LOTTR	2,711,510	1,938,066	2,333,323
Calculate Annual Total Tailpipe CO ₂ Emissions on the NHS	2,969,964	2,150,001	2,569,385
Section 490.513—Calculation of Performance Measures for NHS Performance	3,266,268	2,371,668	2,827,368
Calculate Interstate and Non-Interstate NHS Travel Time Reliability Performance Measures	3,186,603	2,313,822	2,758,408
Calculate Percent Change in Tailpipe CO ₂ Emissions on the NHS Compared to the Calendar Year 2017 Level Performance Measure	79,665	57,846	68,960
Section 490.611—Calculation of Freight Movement Metric	1,611,187	1,207,755	1,414,654
Calculate Truck Travel Time Reliability Index Metric	196,486	183,632	190,763
Section 490.613—Calculation of Freight Movement Measure	7,647,847	5,553,174	6,620,179
Calculate Truck Travel Time Reliability Index Performance Measure	7,647,847	5,553,174	6,620,179
Section 490.711—Calculation of Traffic Congestion Metric	6,227,101	4,357,789	5,308,381
Calculate Total Peak Hour Excessive Delay Metric	1,843,947	1,260,566	1,556,458
Section 490.713—Calculation of Traffic Congestion Measures	6,015,878	4,056,117	5,045,792
Calculate Annual Hours of Peak Hour Excessive Delay Per Capita Performance Measure	5,917,257	3,989,623	4,963,074
Calculate Percent of Non-SOV Travel Performance Measure	98,621	66,494	82,718
Section 490.813—Calculation of Emissions Measure	2,660,121	1,931,539	2,302,671
Calculate Total Emissions Reduction Performance Measure	2,660,121	1,931,539	2,302,671
Total Cost of Final Rule	205,481,684	153,123,439	179,842,135

* Totals may not sum due to rounding.

The costs in Tables 3 and 4 assume a portion of the estimated 409 MPOs will establish their own targets, and the rest will adopt State DOT targets. It is assumed that State DOTs and MPOs serving Transportation Management Areas (TMA)⁷⁴ will use staff to establish performance targets. Conversely, it is assumed that MPOs not serving a TMA will agree to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT targets. Therefore, they will not incur any incremental costs. There are currently an estimated 201 MPOs

serving TMAs.⁷⁵ The FHWA made this assumption because larger MPOs may have more resources available to develop performance targets. The FHWA believes that this is a conservative estimate, as larger MPOs may elect not to establish their own targets for a variety of reasons, including resource availability.

The final rule’s 10-year undiscounted cost (\$144.0 million in Scenario 1 and

\$205.5 million in Scenario 2, in 2014 dollars) decreased relative to the proposed rule (\$165.3 million in Scenario 1 and \$224.5 million in Scenario 2, in 2012 dollars). As discussed below, FHWA made a number of changes that affected cost.

General Updates

In the final rule RIA, FHWA updated all costs to 2014 dollars from the 2012 dollars used in the proposed rule RIA. In addition, FHWA updated labor costs to reflect current BLS data. These general updates increased the estimated cost of the final rule relative to the proposed rule.

The FHWA deferred the effective date from 2016 to 2017 and shortened the period of analysis from 11 years in the proposed rule to 10 years in the final rule. All costs that related to activities

⁷⁴ A TMA is an urbanized area having a population of over 200,000 or otherwise requested by the Governor and the MPO and officially designated by FHWA or FTA. 23 U.S.C. 134(k).

⁷⁵ The FHWA updated the estimated total number of MPOs to 409, which is less than the 420 MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 Census would have MPOs designated for them. In reality, some of the newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected.

that were scheduled to begin in 2016 under the NPRM will now begin in 2017, and costs are estimated for 10 years instead of 11 years to be consistent with the other two performance measure rulemaking RIAs. This reduction in the period of analysis led FHWA to remove the cost of the Initial Performance Report, which State DOTs have already submitted to the agency. Therefore, estimated costs of the final rule decreased relative to the proposed rule.

The FHWA also updated the estimated total number of MPOs to 409, which is less than the 420 MPOs used at the time that the NPRM was published. The estimated number of MPOs serving TMAs is now 201, less than the estimate of 210 in the NPRM. The number of non-TMA MPOs is 208, less than the estimate of 210 in the NPRM. At the time the RIA was prepared for the NPRM, FHWA assumed that the 36 new urbanized areas resulting from the 2010 Census would have MPOs designated for them. However, some of these newly designated urbanized areas merged with existing MPOs, resulting in the designation of fewer new MPOs than expected. The FHWA estimates that, on average, only the 201 larger MPOs serving TMAs will establish their own quantifiable performance targets. The FHWA also estimates that the 208 smaller MPOs serving non-TMAs will choose to agree to plan and program projects so that they contribute toward the accomplishment of State DOT NHS performance, freight movement, and traffic congestion and emissions condition-related performance targets. Therefore, only the 201 larger MPOs serving TMAs will incur costs to reprogram and upgrade their software to be able to perform calculations of the performance measures. The reduction in the number of MPOs decreased the estimated costs to comply with the requirements of the final rule relative to the proposed rule.

Other Updates

In the final rule, FHWA eliminated three of the proposed performance measures (one of the proposed freight measures for percent of the Interstate congested and merging two proposed peak-hour travel time measures under NHPP with proposed excessive delay measure under CMAQ Traffic Congestion into one measure under CMAQ). In addition, the final rule does not include one of the proposed performance metrics (On-Road Mobile Source Emissions). At the same time, the final rule created two new performance measures (Percent of Non-SOV Travel and Percent Change in

Tailpipe CO₂ Emissions on the NHS Compared to the Calendar Year 2017 Level). Additionally, in the RIA, FHWA adjusted estimates for level of effort and number of affected State DOTs and MPOs to be consistent with the final rule requirements. On balance, these changes reduced the total estimated cost of the final rule relative to the proposed rule.

Break-Even Analysis

Currently, State DOTs differ in the way they evaluate the performance of the NHS, freight movement, traffic congestion, and on-road mobile source emissions. These differences hinder accurate analysis at the national level. The final rulemaking will not only establish uniform performance measures, but also will establish processes that (1) State DOTs and MPOs use to report measures and establish performance targets and (2) FHWA uses to assess progress that State DOTs have made toward achieving targets.

Upon implementation, FHWA expects that the will rule will result in some significant benefits that are not easily monetized, but nonetheless deserve mention in this analysis. Specifically, the final rule will allow for more informed decisionmaking on traffic congestion-, freight-, and air-quality-related project, program, and policy choices. The final rule also will yield greater accountability because the MAP-21-mandated reporting will increase visibility and transparency. In addition the final rule will help focus the Federal-aid highway program on achieving balanced performance outcomes.

The expected benefits discussed above (*i.e.*, more informed decisionmaking, greater accountability, and the focus on making progress toward the national goal for infrastructure condition) will lead to an enhanced performance of the NHS due to reduced traffic congestion, improved freight movement, and reduced emissions. The benefits, while real and substantial, are difficult to forecast and monetize. Therefore, FHWA addresses this issue by using the break-even analysis method suggested by OMB Circular A-4. Break-even analyses calculate the threshold a specific variable must achieve in order for benefits to equal costs while holding every other variable in the analysis constant.

The FHWA identified four variables (or outcomes) for which to estimate break-even thresholds: (1) Number of passenger travel hours, (2) tons of transportation-related carbon dioxide emissions, (3) number of truck travel

hours, and (4) kilograms of on-road mobile source emissions, comprising volatile organic compounds, nitrogen oxide, particulate matter, and carbon monoxide. The FHWA selected these variables because it is reasonable to assume that the performance measures will influence each of these variables relative to current baseline levels.

After identifying these variables, FHWA combined the final rule costs associated with the performance measures that will influence each variable. The FHWA expects that implementation of four of the rule's performance measures (Percent of Person-Miles Traveled on the Interstate That Are Reliable, Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable, Annual Hours of Peak Hour Excessive Delay Per Capita, and Percent of Non-SOV Travel) will influence passenger travel hours. The FHWA expects that implementation of the performance measure for Percent Change in Tailpipe CO₂ Emissions on the NHS Compared to the Calendar Year 2017 Level will influence tons of carbon dioxide emissions. The FHWA expects that implementation of the performance measure for Truck Travel Time Reliability Index will influence number of truck travel hours. The FHWA expects that implementation of the performance measure for Total Emissions Reduction will influence kilograms of on-road mobile source emissions.

The FHWA chose to present two of the break-even variables (number of passenger travel hours and tons of carbon dioxide emissions) together because the performance measure expected to improve tons of carbon dioxide emissions, Percent Change in Tailpipe CO₂ Emissions on the NHS Compared to the Calendar Year 2017 Level, is one of three performance measures used to assess the performance of the Interstate System and the non-Interstate NHS for the purpose of carrying out the National Highway Performance Program (NHPP). The other two performance measures under NHPP are Percent of Person-Miles Traveled on the Interstate That Are Reliable and Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable, both of which are expected to influence passenger travel hours. In order to assess NHPP performance measures together, FHWA presents the break-even thresholds for these variables together. The remaining two performance measures included in the break-even analysis for number of passenger travel hours (Annual Hours of Peak Hour Excessive Delay Per Capita and Percent of Non-SOV Travel) assess

the CMAQ program but are expected to influence passenger travel hours.

Two variables (number of passenger travel hours and number of truck travel hours) are associated with performance measures whose costs differ under two scenarios feasible under the final rule; in Scenario 1, FHWA provides travel time data to State DOTs, in Scenario 2, State DOTs acquire the necessary data independently. To account for this, FHWA performed the break-even analyses twice for these two variables (*i.e.*, once using Scenario 1 costs, and a second time using Scenario 2 costs). The costs associated with the remaining two variables (tons of carbon dioxide emissions and kilograms of on-road mobile source emissions) do not change under Scenarios 1 and 2, therefore only one break-even threshold is calculated for each analysis. In all, FHWA presents six break-even thresholds: (1) Number of passenger travel hours under Scenario 1, (2) number of passenger travel hours under Scenario 2, (3) tons of carbon dioxide emissions, (4) number of truck travel hours under Scenario 1, (5) number of truck travel hours under Scenario 2, and (6) kilograms of on-road mobile source emissions.

For the break-even analyses associated with passenger travel hours

and tons of carbon dioxide emissions, FHWA summed the costs associated with the following final rule sections:

- Sections 490.103. Seventy-five percent of the total cost of complying with the data requirements;
- Section 490.105. Approximately 71 percent of the cost of establishing performance targets;
- Section 490.107. Approximately 71 percent of the cost of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 71 percent of the cost of reporting performance targets;
- Section 490.107. Approximately 67 percent of the cost of preparing CMAQ performance plan;
- Section 490.107. Seventy-five percent of the cost of adjusting HPMS and processing data;
- Section 490.109. Cost of assessing significant progress for NHPP measures;
- Section 490.511. The cost of calculating the system performance metrics;
- Section 490.513. The cost of calculating the system performance management measures;
- Section 490.711. Cost of calculating the traffic congestion metric; and
- Section 490.713. Cost of calculating the traffic congestion measure.

Table 5 presents the savings in passenger travel hours and carbon dioxide emissions that the final rule under Scenario 1 would need to save in order to be cost-beneficial (*i.e.*, FHWA provides NPMRDS data to State DOTs). The results represent two break-even points: (1) The passenger car travel time (in hours) that will need to be saved in order to justify the costs, and (2) the amount of carbon dioxide emissions (in tons) that will need to be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 370,000 hours of passenger car travel time, or 3.7 million hours over 10 years, as well as 31,000 tons of carbon dioxide emissions, or 312,000 tons over 10 years. To provide context, private commuters in 471 urban areas across the United States experience 6.9 billion hours of travel delay per year.⁷⁶ The EPA data indicates that the transportation sector emitted approximately 1.74 billion tons of carbon dioxide in 2014.⁷⁷ As a result, the reduction represents a less than 0.01 percent decrease in the amount of travel delay per year for major U.S. urban areas and in the average annual amount of carbon dioxide emissions from the transportation sector.

TABLE 5—BREAK-EVEN ANALYSIS OF NHPP AND CMAQ TRAFFIC CONGESTION PERFORMANCE MEASURES UNDER SCENARIO 1

	Undiscounted 10-year costs	Average commuter value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
	a	b	c = a ÷ b	d = c ÷ 10
Passenger Travel Hours	\$86,069,537	\$23.42	3,674,733	367,473
	Undiscounted 10-year costs	Average emission ton cost (\$ per ton)	Number of emissions tons needed to be reduced	Average annual number of emissions tons needed to be reduced
Carbon dioxide emissions	\$13,906,452	\$44.53	312,302	31,230

Table 6 presents the results from the break-even analysis under Scenario 2 (*i.e.*, State DOTs independently acquire the necessary data). The results represent two break-even points: (1) The passenger car travel time (in hours) that will need to be saved in order to justify the costs, and (2) the amount of carbon

dioxide emissions (in tons) that will need to be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 560,000 hours annually, or 5.6 million hours over 10 years as well as 31,000 tons of carbon dioxide emissions, or 312,000 tons over

10 years. To provide context, private commuters in 471 urban areas across the United States experience 6.9 billion hours of travel delay per year.⁷⁸ The EPA data indicates that the transportation sector emitted approximately 1.74 billion tons of

⁷⁶Texas A&M Transportation Institute, "2015 Urban Mobility Scorecard," 2014, Table 2, p. 25. <http://d2dt15nnpfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf>.

⁷⁷In 2014, the transportation sector accounted for 1.74 billion tons of carbon dioxide emissions, according to the EPA's Greenhouse Gas Inventory Data Explorer.

⁷⁸Texas A&M Transportation Institute, "2015 Urban Mobility Scorecard," 2014, Table 2, p. 25. <http://d2dt15nnpfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf>.

carbon dioxide in 2014.⁷⁹ As a result, the reduction represents a less than 0.01 percent decrease in the amount of travel

delay per year for major U.S. urban areas and in the average annual amount

of carbon dioxide emissions from the transportation sector.

TABLE 6—BREAK-EVEN ANALYSIS OF NHPP AND CMAQ TRAFFIC CONGESTION PERFORMANCE MEASURES UNDER SCENARIO 2

	Undiscounted 10-year costs	Average commuter value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
	a	b	c = a ÷ b	d = c ÷ 10
Passenger travel hours	\$132,201,018	\$23.42	5,644,314	564,431
	Undiscounted 10-year costs	Average emission ton cost (\$ per ton)	Total number of emissions tons that need to be reduced	Average annual number of emissions tons that need to be reduced
Carbon dioxide emissions	\$13,906,452	\$44.53	312,302	31,230

* Please refer to the Summary Report for details on the methodology used in the analysis.

Relative to the proposed rule, the thresholds for the NHS performance break-even analysis increased in the final rule. Specifically, under Scenario 1, the number of annual hours of reduction in passenger car travel time increased from approximately 350,000 in the proposed rule to approximately 370,000 in the final rule. Under Scenario 2, the number of annual hours of reduction in passenger car travel time increased from approximately 500,000 in the proposed rule to 560,000 in the final rule. The break-even points increased primarily due to the addition of the Percent of Non-SOV Travel performance measure. No break-even point was estimated for carbon dioxide emissions in the proposed rule stage because the relevant performance measure, Percent Change in Tailpipe CO₂ Emissions on the NHS Compared to

the Calendar Year 2017 Level, was added to the final rule.

For the break-even analyses associated with improving freight performance, the costs associated with the following final rule sections are summed together to estimate the total cost of provisions aimed at reducing freight congestion:

- Section 490.103. Twenty-five percent of the cost of obtaining data requirements;
- Section 490.105. Approximately 14 percent of the cost of establishing performance targets;
- Section 490.107. Approximately 14 percent of the cost of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 14 percent of the cost of reporting performance targets;
- Section 490.107. Twenty-five percent of the cost of adjusting HPMS and processing data;

- Section 490.109. Cost of assessing significant progress for NHFP measure;
- Section 490.611. Cost of calculating freight movement metric; and
- Section 490.613. Cost of calculating freight movement measure.

Table 7 presents the results from the freight movement break-even analysis under Scenario 1. The results represent the freight travel time (in hours) that will need to be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 98,000 hours annually, or 982,000 hours over 10 years. To provide context, truck drivers in 498 urban areas across the United States experience 353 million hours of travel delay per year.⁸⁰ This reduction represents a 0.03 percent decrease in the amount of travel delay per year for major U.S. urban areas.

TABLE 7—BREAK-EVEN ANALYSIS OF NHFP PERFORMANCE MEASURE UNDER SCENARIO 1

Undiscounted 10-year costs	Average truck value of time (\$ per hour)	Number of hours of travel that need to be reduced	Average annual number of hours of travel that need to be reduced
A	B	c = a ÷ b	d = c ÷ 10
\$25,752,858	\$26.22	982,239	98,224

⁷⁹In 2014, the transportation sector accounted for 1.74 billion tons of carbon dioxide emissions, according to the EPA's Greenhouse Gas Inventory Data Explorer.

⁸⁰Texas A&M Transportation Institute, "TTT's 2012 Urban Mobility Report," 2011, Table 5, p. 43. <https://assets.documentcloud.org/documents/566377/2012-urban-mobility-report.pdf>.

Table 8 presents the results from the freight movement break-even analysis under Scenario 2 (i.e., State DOTs independently acquire the necessary data). The results represent the freight travel time (in hours) that will need to

be saved in order to justify the costs. The analysis shows that the final rule will need to result in the reduction of approximately 157,000 hours annually, or 1.6 million hours over 10 years. To provide context, truck drivers in 498

urban areas across the United States experience 353 million hours of travel delay per year.⁸¹ This reduction represents a 0.04 percent decrease in the amount of travel delay per year for major U.S. urban areas.

TABLE 8—BREAK-EVEN ANALYSIS OF NHFP PERFORMANCE MEASURE UNDER SCENARIO 2

Undiscounted 10-year costs A	Average truck value of time (\$ per hour) B	Number of hours of travel that need to be reduced c = a ÷ b	Average annual number of hours of travel that need to be reduced d = c ÷ 10
\$41,130,019	\$26.22	1,568,738	156,874

* Please refer to the Summary Report for details on the methodology used in the analysis.

Relative to the proposed rule, the thresholds for the freight performance break-even analysis decreased in the final rule. Specifically, under Scenario 1, the number of annual hours of reduction in freight travel time decreased from approximately 140,000 in the proposed rule to 98,000 in the final rule. Under Scenario 2, the number of annual hours of reduction in freight travel time decreased from 250,000 in the proposed rule to 160,000 in the final rule. The break-even points decreased primarily due to the elimination of the Average Truck Speed performance measure.

For the break-even analysis associated with the performance measure for Total

Emissions Reduction, the costs associated with the following final rule sections are summed together to estimate the total cost of provisions aimed at reducing total emissions:

- Section 490.105. Approximately 14 percent of the cost of establishing performance targets;
- Section 490.107. Approximately 14 percent of the cost of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 14 percent of the cost of reporting performance targets;
- Section 490.107. Approximately 33 percent of the cost of preparing CMAQ performance plan;

- Section 490.811. Cost of calculating emissions metric; and
- Section 490.813. Cost of calculating emissions measure.

Tables 9, 10, and 11 present the results from the total emissions break-even analysis. The costs associated with the Total Emissions Reduction performance measure are identical under Scenario 1 and Scenario 2 because State DOTs would not need data from NPMRDS. Therefore, FHWA presents one set of results. The results represent the amount of emissions (in kilograms) that will need to be reduced in order to justify the costs. To calculate the cost of a kilogram of emissions, the analysis used the following inputs:

TABLE 9—INPUTS FOR CALCULATING COST PER KILOGRAM OF EMISSIONS

Emission	Passenger consumption rate (grams per VMT) A	Percentage of "emission kilogram" b = a ÷ Σa	Societal cost of emissions (\$ per long ton) C	Weighted "emission kilogram" d = b c
Volatile Organic Compound (VOC)	1.034	9.289	\$1.46	\$0.14
Nitrogen Oxide (NO _x)	0.693	6.226	5.96	0.37
Particulate Matter (PM _{2.5})	0.0041	0.037	325.88	0.12
Carbon Monoxide (CO)	9.4	84.448	0.00	0.00
Cost of an Emission Kilogram				0.63

Based on this cost per kilogram, the analysis shows that the final rule will need to result in the reduction of approximately 2.9 million kilograms annually, or 29.1 million kilograms over

10 years. To provide context, data from the EPA Office of Air Quality Planning and Standards indicate that highway vehicles emitted 2 billion kilograms of VOCs, 4.1 billion kilograms of NO_x, 0.2

billion kilograms of PM_{2.5}, and 20.2 billion kilograms CO in 2014.⁸² This reduction represents approximately 0.01 percent of total annual national emissions of these pollutants.

⁸¹ Texas A&M Transportation Institute, "TTI's 2012 Urban Mobility Report," 2011, Table 5, p. 43. <https://assets.documentcloud.org/documents/566377/2012-urban-mobility-report.pdf>.

⁸² EPA, "Air Pollutant Emissions Trends Data," Average Annual Emissions. <https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data>.

TABLE 10—BREAK-EVEN ANALYSIS OF TOTAL EMISSIONS REDUCTION PERFORMANCE MEASURE USING EMISSION KILOGRAM METRIC

Undiscounted 10-year costs a	Average emission kilogram cost (\$ per long ton) B	Number of emissions kilograms needed to be reduced c = a ÷ b	Average annual number of emissions kilograms needed to be reduced d = c ÷ 10
\$18,244,195	\$0.63	29,119,356	2,911,936

This amount was split into specific emissions reductions in volatile organic compounds, nitrogen oxide, particulate matter 2.5, and carbon monoxide. Table 11 shows these reductions.

TABLE 11—CALCULATION OF AVERAGE ANNUAL REQUIRED EMISSIONS REDUCTION

Average annual number of emissions kilograms needed to be reduced	
VOC Kilograms	270,498
NO _x Kilograms	181,291
PM _{2.5} Kilograms	1,073
CO Kilograms	2,459,074
Total "Emission" Kilograms	2,911,936

Relative to the proposed rule, the thresholds for the total emissions break-even analysis decreased in the final rule. Specifically, the reduction in total emissions decreased from 4,400 emission tons (approximately 4 million kilograms⁸³) in the proposed rule to 2.9 million emission kilograms in the final rule. The break-even points decreased primarily due to the elimination of the performance metric for on-road mobile source emissions.

Responses to Public Comments on the NPRM's Regulatory Impact Analysis

A number of State DOTs, MPOs, and other organizations provided comments on the regulatory impact analysis for the NPRM.⁸⁴ In terms of benefits, the Association for Commuter Transportation, an advocacy group, expressed support and asserted that the costs of the rule are minimal relative to the planning process used to determine how to spend nearly \$50 billion a year.

The Michigan and Montana DOTs and Sarasota/Manatee MPO claimed that the costs of the rule do not justify the

benefits. As described in Section 5 of the RIA, FHWA believes that the final rule will result in many benefits (both qualitative and quantitative). Through five break-even analyses, FHWA demonstrates the levels of change needed to justify the costs of the rule. The full analysis is available in the docket of this final rulemaking.

The AMPO asserted that the rule will require MPOs to adjust current operations to accommodate new roles and responsibilities. The final rule for Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning (Docket No. FHWA–2013–0037) accounts for activities unique to this planning process, including specific items suggested by this commenter. The FHWA considered the new roles and responsibilities MPOs would face under the final rule, separately from costs related to the planning process so as not to double count effort, and estimated the associated costs in this final rule's RIA. For a detailed description of the analysis, see Section 4 of the RIA found in the docket of this rulemaking.

The Denver Regional Council of Governments and the New York Metropolitan Transportation Council suggested that FHWA underestimated the costs of the rule. Under the final rule, MPOs are not required to provide separate reporting to FHWA, but must agree on a reporting process with State DOTs and report certain requirements to the State. The final rule for Statewide

and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning (Docket No. FHWA–2013–0037) accounts for activities unique to this planning process. The FHWA, however, has estimated the costs for State DOTs and MPOs to prepare and submit reports as well as the costs of all other provisions specific to this final rule. For a detailed analysis, see Section 4 of the RIA.

Two commenters questioned FHWA's estimate of the cost of data requirements. The Oregon Department of Transportation and the Washington State Department of Transportation requested more details from FHWA on the costs of obtaining NPRMDS if FHWA does not provide the data to State DOTs. Due to uncertainty regarding the long-term funding of NPRMDS, FHWA estimated the costs of this rule under two scenarios: One in which NPRMDS data are made available to State DOTs and another in which State DOTs must acquire their own data. Based on interviews with Federal and State DOT SMEs, FHWA confirmed that the data required for calculating performance metrics and measures are readily accessible from the NPRMDS or equivalent data sources. Use of NPRMDS or other data sources would constitute an incremental burden on State DOTs in the form of sharing data, training staff, acquiring and processing data, and other processes. The level of this burden would depend on each individual State DOT's existing level of

⁸³ Using a conversion rate of 1 U.S. ton = 907.185 kilograms.

⁸⁴ Association of Metropolitan Planning Organizations, Denver Regional Council of Governments, Association for Commuter Transportation, Michigan Department of Transportation, Montana Department of Transportation, New York Metropolitan Transportation Council, Oregon Department of Transportation, Sarasota/Manatee Metropolitan Planning Organization, Washington State Department of Transportation.

sophistication in current roadway traffic data analysis. For a detailed analysis, see Section 4 of the RIA.

B. Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96–354, 5 U.S.C. 601–612), FHWA has evaluated the effects of this action on small entities and has determined that the action would not have a significant economic impact on a substantial number of small entities. The final rule addresses the obligation of Federal funds to State DOTs for Federal-aid highway projects. The rule affects two types of entities: State governments and MPOs. State governments do not meet the definition of a small entity under 5 U.S.C. 601, which have a population of less than 50,000.

The MPOs are considered governmental jurisdictions, and to qualify as a small entity they would need to serve less than 50,000 people. The MPOs serve urbanized areas with populations of 50,000 or more. As discussed in the RIA, the rule is expected to impose costs on MPOs that serve populations exceeding 200,000. Therefore, the MPOs that incur economic impacts under this proposed rule do not meet the definition of a small entity.

I hereby certify that this regulatory action would not have a significant impact on a substantial number of small entities.

C. Unfunded Mandates Reform Act of 1995

The FHWA has determined that this action does not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, March 22, 1995, 109 Stat. 48). This rule does not include a Federal mandate that may result in expenditures of \$151 million or more in any 1 year (when adjusted for inflation) in 2012 dollars for either State, local, and tribal governments in the aggregate, or by the private sector. Additionally, the definition of “Federal mandate” in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

D. Executive Order 13132 (Federalism Assessment)

The FHWA has analyzed this action in accordance with the principles and criteria contained in Executive Order

13132. The FHWA has determined that this action does not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this action does not preempt any State law or State regulation or affect the States’ ability to discharge traditional State governmental functions.

E. Executive Order 12372 (Intergovernmental Review)

The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

F. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. The DOT has analyzed this action under the PRA and has determined that this rulemaking contains collection of information requirements for the purposes of the PRA.

This rule provides definitions and outlines processes for performance elements of this final rule. Some burdens in this rule would be realized in other reporting areas as described below. The PRA activities that are already covered by existing OMB Clearances have reference numbers for those clearances as follows: HPMS information collection, OMB No. 2125–0028 with an expiration of May 2019 and CMAQ Program OMB 2125–0614 with an expiration date of August 2018. Any increase in PRA burdens caused by MAP–21 and the FAST Act in these areas will be addressed in PRA approval requests associated with those rulemakings.

This rulemaking requires the submittal of performance reports. The DOT has analyzed this final rule under the PRA and has determined the following:

Respondents: Approximately 262 applicants consisting of State DOTs and MPOs.

Frequency: Biennially.

Estimated Average Burden per Response: Approximately 416 hours to complete and submit the report.

Estimated Total Annual Burden Hours: Approximately 65,312 hours annually.

G. National Environmental Policy Act

The FHWA has analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), and has determined that this action would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

H. Executive Order 12630 (Taking of Private Property)

The FHWA has analyzed this action under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this action would affect a taking of private property or otherwise have taking implications under Executive Order 12630.

I. Executive Order 12988 (Civil Justice Reform)

This action meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

J. Executive Order 13045 (Protection of Children)

We have analyzed this rule under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The FHWA certifies that this action would not cause an environmental risk to health or safety that might disproportionately affect children.

K. Executive Order 13175 (Tribal Consultation)

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that the action would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The rulemaking addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

L. Executive Order 13211 (Energy Effects)

The FHWA has analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has

determined that this is not a significant energy action under that order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

*M. Executive Order 12898
(Environmental Justice)*

The E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this rule does not raise any environmental justice issues.

N. Privacy Impact Assessment

The FHWA continues to assess the privacy impacts of this rule as required by section 522(a)(5) of the FY 2005 Omnibus Appropriations Act, Public Law 108-447, 118 Stat. 3268 (December 8, 2004) [set out as a note to 5 U.S.C. 552a].

The FHWA has selected the use of the new NPMRDS as the data source to calculate the metrics for the travel time/speed based measures to ensure consistency and coverage at a national level. This private sector data set provides average travel times derived from vehicle/passenger probe data traveling on the NHS. The FHWA recognizes that probe data is an evolving field and we will continue to evaluate the privacy risks associated with its use.

O. Regulation Identifier Number

An RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

List of Subjects in 23 CFR Part 490

Bridges, Highway safety, Highways and roads, Incorporation by reference, Reporting and recordkeeping requirements.

Issued in Washington, DC, on January 9, 2017, under authority delegated in 49 CFR 1.85.

Gregory G. Nadeau,
Administrator, Federal Highway Administration.

In consideration of the foregoing, FHWA amends 23 CFR part 490 as follows:

PART 490—NATIONAL PERFORMANCE MANAGEMENT MEASURES

■ 1. The authority citation for part 490 continues to read as follows:

Authority: 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

■ 2. Revise subpart A to read as follows:

Subpart A—General Information

Sec.

490.101 Definitions.

490.103 Data requirements.

490.105 Establishment of performance targets.

490.107 Reporting on performance targets.

490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.

490.111 Incorporation by reference.

§ 490.101 Definitions.

Unless otherwise specified, the following definitions apply to this part:

American Community Survey (ACS) is a national level ongoing survey from the U.S. Census Bureau that includes data on jobs, occupations, educational attainment, transportation patterns, and other topics of the Nation's population.

Attainment area as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

Bridge as used in this part is defined in § 650.305 of this chapter, the National Bridge Inspection Standards.

Criteria pollutant is any pollutant for which there is established a NAAQS at 40 CFR part 50. The transportation related criteria pollutants per 40 CFR 93.102(b)(1) are carbon monoxide, nitrogen dioxide, ozone, and particulate matter (PM₁₀ and PM_{2.5}).

Full extent means continuous collection and evaluation of pavement condition data over the entire length of the roadway.

Highway Performance Monitoring System (HPMS) is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways.

Mainline highways means the through travel lanes of any highway. Mainline highways specifically exclude ramps, shoulders, turn lanes, crossovers, rest areas, and other pavement surfaces that are not part of the roadway normally traveled by through traffic.

Maintenance area as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions. For the

purposes of this part, areas that have reached the end of their 20-year maintenance period¹ are not considered as maintenance areas.

Measure means an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets (e.g., a measure for flight on-time performance is percent of flights that arrive on time, and a corresponding metric is an arithmetic difference between scheduled and actual arrival time for each flight).

Metric means a quantifiable indicator of performance or condition.

Metropolitan Planning Organization (MPO) as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

Metropolitan Planning Area as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

National Ambient Air Quality Standards (NAAQS) as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

National Bridge Inventory (NBI) is an FHWA database containing bridge information and inspection data for all highway bridges on public roads, on and off Federal-aid highways, including tribally owned and federally owned bridges, that are subject to the National Bridge Inspection Standards (NBIS).

National Performance Management Research Data Set (NPMRDS) means a data set derived from vehicle/passenger probe data (sourced from Global Positioning Station (GPS), navigation units, cell phones) that includes average travel times representative of all traffic on each mainline highway segment of the National Highway System (NHS), and additional travel times representative of freight trucks for those segments that are on the Interstate System. The data set includes records that contain average travel times for every 15 minutes of every day (24 hours) of the year recorded and calculated for every travel time segment where probe data are available. The NPMRDS does not include any imputed travel time data.

Nonattainment area as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

¹ The maintenance period in CAA Section 175A (42 U.S.C. 7505a) requires the submittal of two maintenance plans totaling 20 years, unless the applicable implementation plan specifies a longer maintenance period. The end of the maintenance period is 20-years from the effective date of the re-designation to attainment and approval of the first 10-year maintenance plan.

Non-SOV travel is defined as any travel mode other than driving alone in a motorized vehicle (*i.e.*, single occupancy vehicle or SOV travel), including travel avoided by telecommuting.

Non-urbanized area means a single geographic area that comprises all of the areas in the State that are not “urbanized areas” under 23 U.S.C. 101(a)(34).

Performance period means a determined time period during which condition/performance is measured and evaluated to: Assess condition/performance with respect to baseline condition/performance; and track progress toward the achievement of the targets that represent the intended condition/performance level at the midpoint and at the end of that time period. The term “performance period” applies to all measures in this part, except the measures for the Highway Safety Improvement Program (HSIP) in subpart B of this part. Each performance period covers a 4-year duration beginning on a specified date (provided in § 490.105).

Reporting segment means the length of roadway that the State Department of Transportation (DOT) and MPOs define for metric calculation and reporting and is comprised of one or more travel time segments.

Target means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

Transportation Management Area (TMA) as used in this part is defined in § 450.104 of this chapter, Transportation Planning and Programming Definitions.

Travel time data set means either the NPMRDS or an equivalent data set that is used by State DOTs and MPOs as approved by FHWA, to carry out the requirements in subparts E, F, and G of this part.

Travel time reliability means the consistency or dependability of travel times from day to day or across different times of the day.

Travel time segment means a contiguous stretch of the NHS for which average travel time data are summarized in the travel time data set.

Truck freight bottleneck, as used in this part, is defined as a segment of roadway identified by the State DOT as having constraints that cause a significant impact on freight mobility and reliability. Bottlenecks may include highway sections that do not meet thresholds for freight reliability identified in § 490.613 or other locations identified by the State DOT. Causes may

include recurring congestion, causing delays in freight movement, or roadway features that impact truck movements, such as steep grades, substandard vertical or horizontal clearances, weight restrictions, delays at border crossings or terminals, or truck operating restrictions.

§ 490.103 Data requirements.

(a) *In general.* Unless otherwise noted in paragraphs (b) through (g) of this section, the data requirements in this section apply to the measures identified in subparts C through H of this part. Additional data requirements for specific performance management measures are identified in 23 CFR sections—

(1) 490.309 for the condition of pavements on the Interstate System;

(2) 490.309 for the condition of pavements on the non-Interstate NHS;

(3) 490.409 for the condition of bridges on the NHS;

(4) 490.509 for the performance of the Interstate System;

(5) 490.509 for the performance of the non-Interstate NHS;

(6) 490.609 for the freight movement on the Interstate System;

(7) 490.709 for traffic congestion; and

(8) 490.809 for on-road mobile source emissions.

(b) *Urbanized area data.* The State DOTs shall submit urbanized area data, including boundaries of urbanized areas, in accordance with the HPMS Field Manual for the purpose of the additional targets for urbanized and non-urbanized areas in § 490.105(e) and establishing and reporting on targets for the CMAQ Traffic Congestion measures in § 490.707. The boundaries of urbanized areas shall be identified based on the most recent U.S. Decennial Census, unless FHWA approves adjustments to the urbanized area as provided by 23 U.S.C. 101(a)(34) and these adjustments are submitted to HPMS.

(c) *Nonattainment and maintenance areas data.* The State DOTs shall use the nonattainment and maintenance areas boundaries based on the effective date of U.S. Environmental Protection Agency (EPA) designations in 40 CFR part 81.

(d) *National Highway System data.* The State DOTs shall document and submit the extent of the NHS in accordance with the HPMS Field Manual.

(e) *Travel time data set.* Travel time data needed to calculate the measures in subparts E, F, and G of this part will come from the NPMRDS, unless the State DOT requests, and FHWA approves, the use of an equivalent data

source(s) that meets the requirements of this section. The State DOT shall establish, in coordination with applicable MPOs, a single travel time data set (*i.e.*, NPMRDS or equivalent data set) that will be used to calculate the annual metrics in subparts E, F, and G of this part. The same data source shall be used for each calendar year. A State DOT and MPO(s) must use the same travel time data set for each reporting segment for the purposes of calculating the metrics and measures. The use of equivalent data source(s) shall comply with the following:

(1) State DOTs and MPOs shall use the same equivalent data source(s) for a calendar year;

(2) The State DOT shall request FHWA approval for the use of such equivalent data source(s) no later than October 1st before the beginning of the calendar year in which the data source would be used to calculate metrics and FHWA must approve the use of that data source prior to a State DOT and MPO(s)'s implementation and use of that data source;

(3) The State DOT shall make the equivalent data source(s) available to FHWA, on request;

(4) The State DOT shall maintain and use a documented data quality plan to routinely check the quality and accuracy of data contained within the equivalent data source(s); and

(5) If approved by FHWA, the equivalent data source(s) shall:

(i) Be used by both the State DOT and all MPOs within the State for all applicable travel time segments and be referenced by HPMS location referencing standards; and

(ii) In combination with or in place of NPMRDS data, include:

(A) Contiguous segments that cover the mainline highways full NHS, as defined in 23 U.S.C. 103, within the State and MPO boundary; and

(B) Average travel times for at least the same number of 15 minute intervals and the same locations that would be available in the NPMRDS;

(iii) Be populated with observed measured vehicle travel times and shall not be populated with travel times derived from imputed (historic travel times or other estimates) methods. Segment travel times may be derived from travel times reported over a longer time period of measurement (path processing or equivalent);

(iv) Include, for each segment at 15 minute intervals throughout the time periods specified in paragraphs (e)(5)(iv)(A) and (B) of this section for each day of the year, the average travel time, recorded to the nearest second,

representative of at least one of the following:

(A) All traffic on each segment of the NHS (24 hours on Interstate; 6 a.m. to 8 p.m. for non-Interstate NHS); or

(B) Freight vehicle traffic on each segment of the Interstate System (24 hours);

(v) Include, for each segment, a recording of the time and date of each 15 minute travel time record;

(vi) Include the location (route, functional class, direction, State), length and begin and end points of each segment; and

(vii) Be available within 60 days of measurement.

(f) *Reporting segments.* State DOTs, in coordination with MPOs, shall define a single set of reporting segments of the Interstate System and non-Interstate NHS for the purpose of calculating the travel time-based measures specified in §§ 490.507, 490.607, and 490.707 in accordance with the following:

(1) Reporting segments shall be comprised of one or more contiguous Travel Time Segments of same travel direction. State DOTs have the option to accept the Travel Time Segments in the NPMRDS as the reporting segments;

(2) Reporting segments shall not exceed 1 mile in length in urbanized areas unless an individual Travel Time Segment is longer and 10 miles in length in non-urbanized areas unless an individual Travel Time Segment is longer;

(3) All reporting segments collectively shall be contiguous and cover the full extent of the directional mainline highways of the Interstate System and non-Interstate NHS required for reporting the measure; and

(4) The State DOT and applicable MPOs shall document, in manner that mutually agreed upon by all relevant parties, the coordination and agreement on the travel time data set and the defined reporting segments.

(g) *Posted speed limit.* State DOTs are encouraged to report the posted speed limits for the full extent of the NHS in their State via HPMS (HPMS Data Item "Speed_Limit").

§ 490.105 Establishment of performance targets.

(a) *In general.* State DOTs shall establish performance targets for all measures specified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section with the requirements specified in paragraph (e) of this section. The MPOs shall establish performance targets for all measures specified in paragraph (c) of this section for respective target scope identified in

paragraph (d) of this section with the requirements specified in paragraph (f) of this section.

(b) *Highway Safety Improvement Program measures.* State DOTs and MPOs shall establish performance targets for the Highway Safety Improvement Program (HSIP) measures in accordance with § 490.209.

(c) *Applicable measures.* State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network or area shall establish performance targets for the performance measures identified in 23 CFR sections—

(1) 490.307(a)(1) and (2) for the condition of pavements on the Interstate System;

(2) 490.307(a)(3) and (4) for the condition of pavements on the NHS (excluding the Interstate);

(3) 490.407(c)(1) and (2) for the condition of bridges on the NHS;

(4) 490.507(a)(1) and (2) for the NHS Travel Time Reliability;

(5) 490.507(b) for the greenhouse gas (GHG) performance for the NHS;

(6) 490.607 for the freight movement on the Interstate System;

(7) 490.707(a) and (b) for traffic congestion; and

(8) 490.807 for on-road mobile source emissions.

(d) *Target scope.* Targets established by State DOTs and MPOs shall, regardless of ownership, represent the transportation network or geographic area, including bridges that cross State borders, that are applicable to the measures as specified in paragraphs (d)(1) and (2) of this section.

(1) State DOTs and MPOs shall establish statewide and metropolitan planning area wide targets, respectively, that represent the condition/performance of the transportation network or geographic area that are applicable to the measures, as specified in 23 CFR sections—

(i) 490.303 for the condition of pavements on the Interstate System measures specified in § 490.307(a)(1) and (2);

(ii) 490.303 for the condition of pavements on the NHS (excluding the Interstate) measures specified in § 490.307(a)(3) and (4);

(iii) 490.403 for the condition of bridges on the NHS measures specified in § 490.407(c)(1) and (2);

(iv) 490.503(a)(1) for the Travel Time Reliability measures specified in § 490.507(a)(1) and (2);

(v) 490.503(b) for the GHG measure for the NHS specified in § 490.507(b);

(vi) 490.603 for the Freight Reliability measure specified in § 490.607; and

(vii) 490.803 for the Total Emissions Reduction measure identified in § 490.807.

(2) State DOTs and MPOs shall establish a single urbanized area target that represents the performance of the transportation network in each applicable area for the CMAQ Traffic Congestion measures, as specified in § 490.703.

(3) For the purpose of target establishment in this section and reporting targets and progress evaluation in § 490.107, State DOTs shall describe the urbanized area boundaries within the State boundary in the Baseline Performance Period Report required by § 490.107(b)(1).

(e) *Establishment.* State DOTs shall establish targets for each of the performance measures identified in paragraph (c) of this section for respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.* State DOTs shall establish targets not later than February 20, 2018, and for each performance period thereafter, in a manner that allows for the time needed to meet the requirements specified in this section and so that the final targets are submitted to FHWA by the due date provided in § 490.107(b).

(2) *Coordination.* State DOTs shall coordinate with relevant MPOs on the selection of targets in accordance with 23 U.S.C. 135(d)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Additional targets for urbanized and non-urbanized areas.* In addition to statewide targets, described in paragraph (d)(1) of this section, State DOTs may, as appropriate, for each statewide target establish additional targets for portions of the State.

(i) State DOTs shall describe in the Baseline Performance Period Report required by § 490.107(b)(1) the boundaries used to establish each additional target.

(ii) State DOTs may select any number and combination of urbanized area boundaries and may also select a non-urbanized area boundary for the establishment of additional targets.

(iii) The boundaries used by the State DOT for additional targets shall be contained within the geographic boundary of the State.

(iv) State DOTs shall evaluate separately the progress of each additional target and report that progress as required under § 490.107(b)(2)(ii)(B) and (b)(3)(ii)(B).

(v) Additional targets for urbanized areas and the non-urbanized area are not applicable to the CMAQ Traffic Congestion measures and the Total

Emissions Reduction measure in paragraphs (c)(7) and (8) of this section, respectively.

(4) *Time horizon for targets.* State DOTs shall establish targets for a performance period as follows:

(i) The performance period will begin on:

(A) January 1st of the year in which the Baseline Performance Period Report is due to FHWA and will extend for a duration of 4 years for the measures in paragraphs (c)(1) through (7) of this section; and

(B) October 1st of the year prior to which the Baseline Performance Report is due to FHWA and will extend for a duration of 4 years for the measure in paragraph (c)(8) of this section.

(ii) The midpoint of a performance period will occur 2 years after the beginning of a performance period described in paragraph (e)(4)(i) of this section.

(iii) Except as provided in paragraphs (e)(7) and (e)(8)(v) of this section, State DOTs shall establish 2-year targets that reflect the anticipated condition/performance level at the midpoint of each performance period for the measures in paragraphs (c)(1) through (7) of this section, and the anticipated cumulative emissions reduction to be reported for the first 2 years of a performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(iv) State DOTs shall establish 4-year targets that reflect the anticipated condition/performance level at the end of each performance period for the measures in paragraphs (c)(1) through (7) of this section, and the anticipated cumulative emissions reduction to be reported for the entire performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(5) *Reporting.* State DOTs shall report 2-year targets, 4-year targets, the basis for each established target, progress made toward the achievement of targets, and other requirements to FHWA in accordance with § 490.107. State DOTs shall provide relevant MPO(s) targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets, as described in paragraph (f) of this section.

(6) *Target adjustment.* State DOTs may adjust an established 4-year target in the Mid Performance Period Progress Report, as described in § 490.107(b)(2). State DOTs shall coordinate with relevant MPOs when adjusting their 4-year target(s). Any adjustments made to 4-year targets established for the CMAQ Traffic Congestion measures in

paragraph (c)(7) of this section shall be agreed upon and made collectively by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measures.

(7) *Phase-in of new requirements for Interstate System pavement condition measures and the non-Interstate NHS Travel Time Reliability measures.* The following requirements apply only to the first performance period and to the measures in §§ 490.307(a)(1) and (2) and 490.507(a)(2):

(i) State DOTs shall establish their 4-year targets, required under paragraph (e)(4)(iv) of this section, and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1);

(ii) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(iii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(iii) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. State DOTs may also adjust their 4-year targets, as appropriate.

(8) *Urbanized area specific targets.* The following requirements apply to establishing targets for the CMAQ Traffic Congestion measures in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) For the performance period that begins on January 1, 2018, State DOTs, with mainline highways on the NHS that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary and that urbanized area contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703, shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b).

(ii) Beginning with the performance period that begins on January 1, 2022, and all subsequent performance periods thereafter, State DOTs, with mainline highways on the NHS that cross any part of an urbanized area with a population more than 200,000 within its geographic State boundary and that urbanized area contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703, shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b).

(iii) If required to establish targets for the CMAQ Traffic Congestion measures,

as described in paragraphs (e)(8)(i) and/or (ii) of this section, State DOTs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. In accordance with paragraphs (e)(5) and (f)(9) of this section, the targets reported by the State DOTs and MPOs for that urbanized area shall be identical.

(C) Except as provided in paragraphs (e)(8)(iii)(F) and (e)(8)(v) of this section, State DOTs shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area designation during that performance period.

(D) The 1 million and 200,000 population thresholds, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined based on the most recent annual population estimates published by the U.S. Census available 1 year before when the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations and urbanized areas, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined from the data, contained in HPMS, 1 year before when the State DOT Baseline Performance Period Report is due to FHWA.

(F) The designation of nonattainment or maintenance areas, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.703.

(iv) If a State DOT does not meet the criteria specified in paragraph (e)(8)(i) or (ii) of this section 1 year before when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for the CMAQ Traffic Congestion measures for that performance period.

(v) If the urbanized area, in paragraph (e)(8)(i) or (ii) of this section, does not

contain any part of a nonattainment or maintenance area for the applicable criteria pollutants, as specified in § 490.703, 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA, as described in paragraph (e)(8)(iii)(F) of this section, then that State DOT is not required to meet the requirements in § 490.107 for the CMAQ Traffic Congestion measures for that urbanized area for the remainder of that performance period.

(vi) The following requirements apply only the Peak Hour Excessive Delay (PHED) measure in § 490.707(a) to assess CMAQ Traffic Congestion in to the first performance period:

(A) State DOTs shall establish their 4-year targets, required under paragraph (e)(4)(iv) of this section, and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1).

(B) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(ii) of this section, and baseline condition/performance in their Baseline Performance Period Report.

(C) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. The established baseline condition/performance shall be collectively developed and agreed upon with relevant MPOs.

(D) State DOTs may, as appropriate, adjust their 4-year target(s) in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A). Adjusted 4-year target(s) shall be developed and collectively agreed upon with relevant MPO(s), as described in paragraph (e)(6) of this section.

(E) State DOTs shall annually report metrics for all mainline highways on the NHS for all applicable urbanized area(s) throughout the performance period, as required in § 490.711(f).

(9) *Targets for Total Emissions Reduction measure.* The following requirements apply to establishing targets for the measures specified in paragraph (c)(8) of this section:

(i) The State DOTs shall establish statewide targets for the Total Emissions Reduction measure for all nonattainment and maintenance areas for all applicable criteria pollutants and precursors specified in § 490.803.

(ii) For all nonattainment and maintenance areas within the State geographic boundary, the State DOT shall establish separate statewide targets for each of the applicable criteria pollutants and precursors specified in § 490.803.

(iii) The established targets, as specified in paragraph (e)(4) of this section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iv) In addition to the statewide targets in paragraph (e)(9)(i) of this section, State DOTs may, as appropriate, establish additional targets for any number and combination of nonattainment and maintenance areas by applicable criteria pollutant within the geographic boundary of the State. If a State DOT establishes additional targets for nonattainment and maintenance areas, it shall report the targets in the Baseline Performance Period Report required by § 490.107(b)(1). State DOTs shall evaluate separately the progress of each of these additional targets and report that progress as required under § 490.107(b)(2)(ii)(B) and (b)(3)(ii)(B).

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.803.

(vi) Except as provided in paragraphs (e)(9)(vii) and (viii) of this section, the State DOT shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of nonattainment or maintenance area during that performance period.

(vii) If a State geographic boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants and precursors, as specified in § 490.803, 1 year before the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for Total Emissions Reduction measures for that performance period.

(viii) If the State geographic boundary, in paragraph (e)(9)(ii) of this section, does not contain any part of the nonattainment or maintenance area for an applicable criteria pollutant or precursor, as specified in § 490.803, 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA as described in paragraph (e)(9)(v) of this section, then that State DOT is not required to meet the

requirements in § 490.107 for the Total Emissions Reduction measure for that applicable criteria pollutant or precursor for the remainder of that performance period.

(f) *MPO establishment.* The MPOs shall establish targets for each of the performance measures identified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.* The MPOs shall establish targets no later than 180 days after the respective State DOT(s) establishes their targets, as provided in paragraph (e)(1) of this section.

(i) The MPOs shall establish 4-year targets, described in paragraph (e)(4)(iv) of this section, for all applicable measures, described in paragraphs (c) and (d) of this section.

(ii) Except as provided in paragraph (f)(5)(vi) of this section, the MPOs shall establish 2-year targets, described in paragraph (e)(4)(iii) of this section for the CMAQ Traffic Congestion and Total Emissions Reduction measures, described in paragraphs (c) and (d) of this section as their applicability criteria described in paragraphs (f)(5)(i) and (ii) and (f)(6)(iii) of this section, respectively.

(iii) If an MPO does not meet the criteria described in paragraph (f)(5)(i), (f)(5)(ii), or (f)(6)(iii) of this section, the MPO is not required to establish 2-year target(s) for the corresponding measure(s).

(2) *Coordination.* The MPOs shall coordinate with relevant State DOT(s) on the selection of targets in accordance with 23 U.S.C. 134(h)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Target establishment options.* For each performance measure identified in paragraph (c) of this section, except the CMAQ Traffic Congestion measures in paragraph (f)(5) of this section, and MPOs meeting the criteria under paragraph (f)(6)(iii) of this section for Total Emissions Reduction measure, the MPOs shall establish targets by either:

(i) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure; or

(ii) Committing to a quantifiable target for that performance measure for their metropolitan planning area.

(4) *MPOs serving a multistate planning area.* Except as provided in the CMAQ Traffic Congestion measures in paragraph (f)(5) of this section, and MPOs meeting the criteria under paragraph (f)(6)(iii) of this section, for Total Emissions Reduction measure, MPOs with planning areas extending

across State boundaries shall follow these requirements for each performance measure identified in paragraph (c) of this section:

(i) For each measure, MPOs may choose different target establishment options, provided in paragraph (f)(3) of this section, for the portion of the planning area within each State.

(ii) If MPOs choose the option to agree to plan and program projects to contribute toward State DOT targets, in accordance with paragraph (f)(3)(i) of this section, for a measure, then they shall plan and program projects in support of State DOT targets for the portion of the planning area within each State.

(5) *Urbanized area specific targets.* The following requirements apply to establishing targets for the CMAQ Traffic Congestion measures in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) For the performance period that begins on January 1, 2018, MPOs shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b) when mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million, and that portion of their metropolitan planning area boundary also contains any portion of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703. If an MPO with mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million and that urbanized area contains any part of a nonattainment or maintenance area, for any one of the criteria pollutant as specified in § 490.703, outside of its metropolitan planning area boundary, then that MPO should coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the CMAQ Traffic Congestion measures specified in § 490.707.

(ii) Beginning with the performance period that begins on January 1, 2022, and all subsequent performance periods thereafter, MPOs shall establish targets for the CMAQ Traffic Congestion measures specified in § 490.707(a) and (b) when mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 200,000, and that portion of their metropolitan planning area boundary also contains any portion of a nonattainment or maintenance area for any one of the criteria pollutants, as

specified in § 490.703. If an MPO with mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 200,000 and that urbanized area contains any part of a nonattainment or maintenance area, for any one of the criteria pollutant as specified in § 490.703, outside of its metropolitan planning area boundary, then that MPO should coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the CMAQ Traffic Congestion measures specified in § 490.707.

(iii) If required to establish a target for the CMAQ Traffic Congestion measures, as described in paragraphs (f)(5)(i) and/or (ii) of this section, MPOs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. The targets reported, in accordance with paragraphs (e)(5) and (f)(9) of this section, by the State DOTs and MPOs for that urbanized area shall be identical.

(C) Except as provided in paragraphs (f)(5)(iii)(F) and (f)(5)(v) of this section, MPOs shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area during that performance period.

(D) The 1 million and 200,000 population thresholds, in paragraph (f)(5)(i) and (ii) of this section, shall be determined based on the most recent annual population estimates published by the U.S. Census available 1 year before the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations and urbanized areas, in paragraphs (f)(5)(i) and (ii) of this section, shall be determined from the data, contained in HPMS, 1 year before State DOT Baseline Performance Period Report is due to FHWA.

(F) The designation of nonattainment or maintenance areas, in paragraph (f)(5)(i) and (ii) of this section, shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to

FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.703.

(iv) If an MPO does not meet the criteria specified in paragraph (f)(5)(i) or (ii) of this section at the time that is 1 year before when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the CMAQ Traffic Congestion measure for that performance period.

(v) If the portion of the metropolitan planning area boundary within the urbanized area, in paragraph (f)(5)(i) or (ii) of this section, does not contain any part of a nonattainment or maintenance area for the applicable criteria pollutants, as specified in § 490.703, at the time that is 1 year before when the State DOT Mid Performance Period Progress Report is due to FHWA, as described in paragraph (f)(5)(iii)(F) of this section, then that MPO is not required to meet the requirements in § 490.107 for the CMAQ Traffic Congestion measures for that urbanized area for the remainder of that performance period.

(vi) The following requirements apply only to the first performance period and the PHED measure to assess traffic congestion in § 490.707(a):

(A) The MPOs shall not report 2-year targets, described in paragraph (f)(5)(ii)(A) of this section;

(B) The MPOs shall use the 2-year condition/performance in the State DOT Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as baseline condition/performance. The established baseline condition/performance shall be agreed upon and made collectively with relevant State DOTs; and

(C) The MPOs may, as appropriate, adjust their 4-year target(s). Adjusted 4-year target(s) shall be collectively developed and agreed upon with all relevant State DOT(s), as described in paragraph (f)(8) of this section.

(6) *Targets for the Total Emissions Reduction measure.* The following requirements apply to establishing targets for the measure in paragraph (c)(8) of this section:

(i) The MPO shall establish targets for each of the applicable criteria pollutants and precursors, specified in § 490.803, for which it is in nonattainment or maintenance, within its metropolitan planning area boundary.

(ii) The established targets, as specified in paragraph (e)(4) of this

section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iii) If any part of a designated nonattainment and maintenance area within the metropolitan planning area overlaps the boundary of an urbanized area with a population more than 1 million in population, as of 1 year before the State DOT Baseline Performance Period Report is due to FHWA, then that MPO shall establish both 2-year and 4-year targets for their metropolitan planning area. The population threshold shall be determined based on the most recent annual population estimates published by the U.S. Census available 1 year before the State DOT Baseline Performance Period Report is due to FHWA.

(iv) For the nonattainment and maintenance areas within the metropolitan planning area that do not meet the criteria in paragraph (f)(6)(iii) of this section, MPOs shall establish 4-year targets for their metropolitan planning area, as described in paragraph (f)(3) of this section.

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. EPA's designation under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA. The nonattainment and maintenance areas shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report in § 490.107(b)(2)(ii) is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.803.

(vi) Except as provided in paragraphs (f)(6)(v) and (viii) of this section, MPOs shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of nonattainment or maintenance area or population during that performance period.

(vii) If a metropolitan planning area boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants 1 year before when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the Total Emissions Reduction measure for that performance period.

(viii) If the metropolitan planning area boundary, in paragraph (f)(6)(i) of this section, does not contain any part of a nonattainment or maintenance area for the applicable criteria pollutants, as specified in § 490.803, 1 year before the

State DOT Mid Performance Period Progress Report is due to FHWA, as described in paragraph (f)(6)(v) of this section, then that MPO is not required to meet the requirements in § 490.107 for the Total Emissions Reduction measure for that applicable criteria pollutant or precursor for the remainder of that performance period.

(7) *MPO response to State DOT target adjustment.* For the established targets in paragraph (f)(3) of this section, if the State DOT adjusts a 4-year target in the State DOT's Mid Performance Period Progress Report and if, for that respective target, the MPO established a target by supporting the State DOT target as allowed under paragraph (f)(3)(i) of this section, then the MPO shall, within 180 days, report to the State DOT whether it will either:

(i) Agree to plan a program of projects so that they contribute to the adjusted State DOT target for that performance measure; or

(ii) Commit to a new quantifiable target for that performance measure for its metropolitan planning area.

(8) *Target adjustment.* If the MPO establishes its target by committing to a quantifiable target, described in paragraph (f)(3)(ii) of this section or establishes target(s) for the Total Emissions Reduction measure required in paragraph (f)(6)(iii) of this section, then the MPOs may adjust its target(s) in a manner that is collectively developed, documented, and mutually agreed upon by the State DOT and MPO. Any adjustments made to 4-year targets, established for CMAQ Traffic Congestion measures in paragraph (f)(5)(i) or (ii) of this section, shall be collectively developed and agreed upon by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure.

(9) *Reporting.* The MPOs shall report targets and progress toward the achievement of their targets as specified in § 490.107(c). After the MPOs establish or adjust their targets, the relevant State DOT(s) must be able to provide these targets to FHWA upon request.

§ 490.107 Reporting on performance targets.

(a) *In general.* All State DOTs and MPOs shall report the information specified in this section for the targets required in § 490.105.

(1) All State DOTs and MPOs shall report in accordance with the schedule and content requirements under paragraphs (b) and (c) of this section, respectively.

(2) For the measures identified in § 490.207(a), all State DOTs and MPO shall report on performance in accordance with § 490.213.

(3) State DOTs shall report using an electronic template provided by FHWA.

(b) *State Biennial Performance Report.* State DOTs shall report to FHWA baseline condition/performance at the beginning of a performance period and progress achievement at both the midpoint and end of a performance period. State DOTs shall report at an ongoing 2-year frequency as specified in paragraphs (b)(1) through (3) of this section.

(1) *Baseline Performance Period Report—(i) Schedule.* State DOTs shall submit a Baseline Performance Period Report to FHWA by October 1st of the first year in a performance period. State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018, and subsequent Baseline Performance Period Reports to FHWA by October 1st every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information in each Baseline Performance Period Report:

(A) *Targets.* 2-year and 4-year targets for the performance period, as required in § 490.105(e), and a discussion, to the maximum extent practicable, of the basis for each established target;

(B) *Baseline condition/performance.* Baseline condition/performance derived from the latest data collected through the beginning date of the performance period specified in § 490.105(e)(4)(i) for each target, required under paragraph (b)(1)(ii)(A) of this section;

(C) *Relationship with other performance expectations.* A discussion, to the maximum extent practicable, on how the established targets in paragraph (b)(1)(ii)(A) of this section support expectations documented in longer range plans, such as the State asset management plan required by 23 U.S.C. 119(e) and the long-range statewide transportation plan provided in part 450 of this chapter;

(D) *Urbanized area boundaries and population data for targets.* For the purpose of establishing additional targets for urbanized and non-urbanized areas in § 490.105(e)(3) and the urbanized area specific targets in § 490.105(e)(8), State DOTs shall document the boundary extent for all applicable urbanized areas based on information in HPMS;

(E) *Congestion at truck freight bottlenecks.* The State DOT shall document the location of truck freight bottlenecks within the State, including those identified in the National Freight Strategic Plan. If a State has prepared a

State Freight Plan under 49 U.S.C. 70202, within the last 2 years, then the State Freight Plan may serve as the basis for identifying truck freight bottlenecks;

(F) *Nonattainment and maintenance area for targets.* Where applicable, for the purpose of determining target scope in § 490.105(d) and any additional targets under § 490.105(e)(9)(iv), State DOTs shall describe the boundaries of U.S. EPA's designated nonattainment and maintenance areas, as described in §§ 490.103(c) and 490.105(e)(9)(v);

(G) *MPO CMAQ Performance Plan.* Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section;

(H) *GHG metrics for the GHG measure.* Total tailpipe CO₂ emissions for the calendar year 2017, as described in § 490.511(f)(1) and total tailpipe CO₂ emissions for the 2 preceding calendar years of the year in which Baseline Performance Period Report is due to FHWA, as described in § 490.511(f)(2) for the GHG measure in § 490.507(b); and

(I) *Data collection method for the Percent of Non-SOV Travel measure.* Where applicable, State DOTs shall report the data collection method that is used to determine the Percent of Non-SOV Travel measure, in § 490.707(b), for each applicable urbanized area in the State, as provided in § 490.709(f)(2).

(2) *Mid Performance Period Progress Report—(i) Schedule.* State DOTs shall submit a Mid Performance Period Progress Report to FHWA by October 1st of the third year in a performance period. State DOTs shall submit their first Mid Performance Period Progress Report to FHWA by October 1, 2020, and subsequent Mid Performance Period Progress Reports to FHWA by October 1st every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information in each Mid Performance Period Progress Report:

(A) *2-year condition/performance.* The actual condition/performance derived from the latest data collected through the midpoint of the performance period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *2-year progress in achieving performance targets.* A discussion of the State DOT's progress toward achieving each established 2-year target in paragraph (b)(1)(ii)(A) of this section. The State DOT shall compare the actual 2-year condition/performance in paragraph (b)(2)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D)

and (E) of this section, with the respective 2-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.* A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at truck freight bottlenecks.* Discussion on progress of the State DOT's efforts in addressing congestion at truck freight bottlenecks within the State, as described in paragraph (b)(1)(ii)(F) of this section, through comprehensive freight improvement efforts of State Freight Plan or MPO freight plans; the Statewide Transportation Improvement Program and Transportation Improvement Program; regional or corridor level efforts; other related planning efforts; and operational and capital activities targeted to improve freight movement on the Interstate System. If a State has prepared a State Freight Plan under 49 U.S.C. 70202 within the previous 2 years, then the State Freight Plan may serve as the basis for addressing congestion at truck freight bottlenecks. If the State Freight Plan has not been updated since the previous State Biennial Performance Report, then an updated analysis of congestion at truck freight bottlenecks must be completed;

(E) *Target adjustment discussion.* When applicable, a State DOT may submit an adjusted 4-year target to replace an established 4-year target in paragraph (b)(1)(ii)(A) of this section. If the State DOT adjusts its target, it shall include a discussion on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans, such as the State asset management plan and the long-range statewide transportation plan. The State DOT may only adjust a 4-year target at the midpoint and by reporting the change in the Mid Performance Period Progress Report;

(F) *2-year significant progress discussion for the National Highway Performance Program (NHPP) targets and the National Highway Freight Program (NHFP) target.* State DOTs shall discuss the progress they have made toward the achievement of all 2-year targets established for the NHPP measures in § 490.105(c)(1) through (5) and the Freight Reliability measure in § 490.105(c)(6). This discussion should document a summary of prior accomplishments and planned activities that will be conducted during the remainder of the performance period to

make significant progress toward that achievement of 4-year targets for applicable measures;

(G) *Extenuating circumstances discussion on 2-year Targets.* When applicable, for 2-year targets for the NHPP or NHFP, a State DOT may include a discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making 2-year significant progress toward achieving NHPP or NHFP target(s) in paragraph (b)(2)(ii)(F) of this section;

(H) *Applicable target achievement discussion.* If FHWA determined that a State DOT has not made significant progress toward the achievement of any 4-year NHPP or NHFP targets in the FHWA determination made after the State DOT submits the Full Performance Period Progress Report for the immediate prior performance period, then the State DOT shall include a description of the actions they will undertake to better achieve those targets as required under § 490.109(f). If FHWA determined under § 490.109(e) that the State DOT has made significant progress for immediate prior performance period's 4-year NHPP or NHFP targets, then the State DOT does not need to include this description for those targets;

(I) *MPO CMAQ Performance Plan.* Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section; and

(J) *GHG metrics for the GHG measure.* Total tailpipe CO₂ emissions for 2 preceding calendar years of the year in which the Mid Performance Period Progress Report is due to FHWA, as described in § 490.511(f)(2), for the GHG measure in § 490.507(b).

(3) *Full Performance Period Progress Report—(i) Schedule.* State DOTs shall submit a progress report on the full performance period to FHWA by October 1st of the first year following the reference performance period. State DOTs shall submit their first Full Performance Period Progress Report to FHWA by October 1, 2022, and subsequent Full Performance Period Progress Reports to FHWA by October 1st every 4 years thereafter.

(ii) *Content.* The State DOT shall report the following information for each Full Performance Period Progress Report:

(A) *4-year condition/performance.* The actual condition/performance derived from the latest data collected through the end of the performance period, specified in § 490.105(e)(4), for

each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *4-year progress in achieving performance targets.* A discussion of the State DOT's progress made toward achieving each established 4-year target in paragraph (b)(1)(ii)(A) or (b)(2)(ii)(E) of this section, when applicable. The State DOT shall compare the actual 4-year condition/performance in paragraph (b)(3)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D) and (E) of this section, with the respective 4-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.* A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at truck freight bottlenecks.* Discussion on progress of the State DOT's efforts in addressing congestion at truck freight bottlenecks within the State, as described in paragraphs (b)(1)(ii)(F) and (b)(2)(ii)(D) of this section;

(E) *4-year significant progress evaluation for applicable targets.* State DOTs shall discuss the progress they have made toward the achievement of all 4-year targets established for the NHPP measures in § 490.105(c)(1) through (5) and the Freight Reliability measure in § 490.105(c)(6). This discussion shall include a summary of accomplishments achieved during the performance period to demonstrate whether the State DOT has made significant progress toward achievement of 4-year targets for those measures;

(F) *Extenuating circumstances discussion on applicable targets.* When applicable, a State DOT may include discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making a 4-year significant progress toward achieving NHPP or NHFP targets, described in paragraph (b)(3)(ii)(E) of this section;

(G) *Applicable target achievement discussion.* If FHWA determined that a State DOT has not made significant progress toward the achievement of any 2-year NHPP or NHFP targets in the biennial FHWA determination made after the State DOT submits the Mid Performance Period Progress Report for the performance period, then the State DOT shall include a description of the actions they will undertake to better achieve those targets as required under § 490.109(f). If FHWA determined in

§ 490.109(e) that the State DOT has made significant progress for the 2-year NHPP or NHFP targets for the performance period, then the State DOT does not need to include this description for those targets;

(H) *MPO CMAQ Performance Plan.* Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section; and

(I) *GHG metrics for the GHG measure.* Total tailpipe CO₂ emissions for 2 preceding calendar years of the year in which the Full Performance Period Progress Report is due to FHWA, as described in § 490.511(f)(2), for the GHG measure in § 490.507(b).

(c) *MPO Report.* The MPOs shall establish targets in accordance with § 490.105 and report targets and progress toward the achievement of their targets in a manner that is consistent with the following:

(1) The MPOs shall report their established targets to their respective State DOT in a manner that is documented and mutually agreed upon by both parties.

(2) The MPOs shall report baseline condition/performance and progress toward the achievement of their targets in the system performance report in the metropolitan transportation plan in accordance with part 450 of this chapter.

(3) The MPOs serving a TMA and meeting criteria, specified in § 490.105(f)(6)(iii), shall develop a CMAQ performance plan as required by 23 U.S.C. 149(l). The CMAQ performance plan is not required when the MPO meets the criteria specified in § 490.105(f)(6)(vii) or (viii).

(i) The CMAQ performance plan shall be submitted to FHWA by the State DOT, and be updated biennially on the same schedule as the State Biennial Performance Reports.

(ii) For the CMAQ Traffic Congestion and Total Emissions Reduction measures in subparts G and H of this part, the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report to FHWA shall include:

(A) The 2-year and 4-year targets for the CMAQ Traffic Congestion measures, identical to the relevant State DOT(s) reported target under paragraph (b)(1)(ii)(A) of this section, for each applicable urbanized area;

(B) The 2-year and 4-year targets for the Total Emissions Reduction measure for the performance period;

(C) Baseline condition/performance for each MPO reported CMAQ Traffic Congestion targets, identical to the relevant State DOT(s) reported baseline

condition/performance under paragraph (b)(1)(ii)(B) of this section;

(D) Baseline condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported Total Emissions Reduction target; and

(E) A description of projects identified for CMAQ funding and how such projects will contribute to achieving the performance targets for these measures.

(iii) For the CMAQ Traffic Congestion and Total Emissions Reduction measures in subparts G and H of this part, the CMAQ performance plan submitted with the State DOT's Mid Performance Period Progress Report to FHWA shall include:

(A) 2-year condition/performance for the CMAQ Traffic Congestion measures, identical to the relevant State DOT(s) reported condition/performance under paragraph (b)(2)(ii)(A) of this section, for each applicable urbanized area;

(B) 2-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported Total Emissions Reduction target;

(C) An assessment of the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report toward achieving the 2-year targets for these measures;

(D) When applicable, an adjusted 4-year target to replace an established 4-year target; and

(E) An update to the description of projects identified for CMAQ funding and how those updates will contribute to achieving the 4-year performance targets for these measures.

(iv) For the CMAQ Traffic Congestion and Total Emissions Reduction measures in subparts G and H of this part, the CMAQ performance plan submitted with the State DOT's Full Performance Period Progress Report to FHWA shall include:

(A) 4-year condition/performance for the CMAQ Traffic Congestion measures, identical to the relevant State DOT(s) reported condition/performance reported under paragraph (b)(3)(ii)(A) of this section, for each applicable urbanized area;

(B) 4-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported Total Emissions Reduction target; and

(C) An assessment of the progress of the projects identified in both paragraphs (c)(3)(ii)(C) and (c)(3)(iii)(D) of this section toward achieving the 4-year targets for these measures.

(4) If an MPO elected to establish a quantifiable target, as provided in

§ 490.105(f)(3)(ii), for the GHG measure in § 490.507(b), then that MPO shall report a description of its measure calculation method to its State DOT in a manner that is documented and mutually agreed upon by both the State DOT and the MPO.

§ 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.

(a) *In general.* The FHWA will assess each of the State DOT targets separately for the NHPP measures specified in § 490.105(c)(1) through (5) and the Freight Reliability measure specified in § 490.105(c)(6) to determine the significant progress made toward the achievement of those targets.

(b) *Frequency.* The FHWA will determine whether a State DOT has or has not made significant progress toward the achievement of applicable targets as described in paragraph (e) of this section at the midpoint and the end of each performance period.

(c) *Schedule.* The FHWA will determine significant progress toward the achievement of a State DOT's NHPP and NHFP targets after the State DOT submits the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the State DOT submits the Full Performance Period Progress Report for progress toward the achievement of 4-year targets. The FHWA will notify State DOTs of the outcome of the determination of the State DOT's ability to make significant progress toward the achievement of its NHPP and NHFP targets.

(d) *Source of data/information.* (1) The FHWA will use the following sources of information to assess NHPP target achievement and condition/performance progress:

(i) Data contained within the HPMS on June 15th of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for Interstate System pavement condition measures, as specified in § 490.105(c)(1);

(ii) Data contained within the HPMS on August 15th of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for non-Interstate NHS pavement condition measures, as specified in § 490.105(c)(2);

(iii) The most recently available data contained within the NBI as of June 15th of the year in which the significant progress determination is made for

targets established for NHS bridge condition measures, as specified in § 490.105(c)(3);

(iv) Data contained within the HPMS on August 15th of the year in which the significant progress determination is made that represents performance from the prior year for targets established for the Travel Time Reliability measures, as specified in § 490.105(c)(4);

(v) On October 1st of the year in which the significant progress determination is made, the reported total tailpipe CO₂ emissions for the calendar year 2017 in the Baseline Performance Period Report, as described in § 490.107(b)(1)(ii)(I), and the reported total tailpipe CO₂ emissions in the State Biennial Performance Report, as described in § 490.107(b)(2)(ii)(J) or (b)(3)(ii)(I), in the year in which the significant progress determination is made for GHG measure in § 490.105(c)(5); and

(vi) Baseline condition/performance data contained in HPMS and NBI of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline conditions/performances for the performance period for the measures in § 490.105(c)(1) through (4), and the HPMS data reported in the year in which Baseline Period Performance Report is due to FHWA and the total tailpipe CO₂ emissions reported in the Baseline Period Performance Report, as provided in § 490.107(b)(1)(ii)(I), for the GHG measure in § 490.105(c)(5).

(2) The FHWA will use the following sources of information to assess NHFP target achievement and condition/performance progress:

(i) Data contained within the HPMS on August 15th of the year in which the significant progress determination is made that represents performance from the prior year for targets established for the Freight Reliability measure, as specified in § 490.105(c)(6); and

(ii) Baseline condition/performance data contained in HPMS of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline condition/performance for the performance period.

(e) *Significant progress determination for individual NHPP and NHFP targets—(1) In general.* The FHWA will biennially assess whether the State DOT has achieved or made significant progress toward each target established by the State DOT for the NHPP measures described in § 490.105(c)(1) through (5) and the Freight Reliability measure described in § 490.105(c)(6). The FHWA will assess the significant progress of each statewide target separately using the condition/

performance data/information sources described in paragraph (d) of this section. The FHWA will not assess the progress achieved for any additional targets a State DOT may establish under § 490.105(e)(3).

(2) *Significant progress toward individual NHPP and NHFP targets.* The FHWA will determine that a State DOT has made significant progress toward the achievement of each 2-year or 4-year applicable target if either:

(i) The actual condition/performance level is better than the baseline condition/performance; or

(ii) The actual condition/performance level is equal to or better than the established target.

(3) *Phase-in of new requirements.* The following requirements shall only apply to the first performance period and only to the Interstate System pavement condition targets and non-Interstate NHS Travel Time Reliability targets, described in § 490.105(e)(7):

(i) At the midpoint of the first performance period, FHWA will not make a determination of significant progress toward the achievement of 2-year targets for Interstate System pavement condition measures:

(ii) The FHWA will classify the assessment of progress toward the achievement of targets in paragraph (e)(3)(i) of this section as "progress not determined" so that they will be excluded from the requirement under paragraph (e)(2) of this section; and

(iii) The FHWA will not make a determination of significant progress toward the achievement of 2-year targets for the Non-Interstate NHS Travel Time Reliability measure.

(4) *Insufficient data and/or information.* The FHWA will determine that a State DOT has not made significant progress toward the achievement of an individual NHPP or NHFP target if:

(i) A State DOT does not submit a required report, individual target, or other information as specified in § 490.107 for the each of the measures in § 490.105(c)(1) through (6);

(ii) The data contained in HPMS do not meet the requirements under § 490.313(b)(4)(i) by the data extraction date specified in paragraph (d)(1) of this section for the each of the Interstate System pavement condition measures in § 490.105(c)(1);

(iii) The data contained in HPMS do not meet the requirements under § 490.313(b)(4)(i) by the data extraction date specified in paragraph (d)(2) of this section for the each of the non-Interstate NHS pavement condition measures in § 490.105(c)(2);

(iv) A State DOT reported data are not cleared in the NBI by the data extraction date specified in paragraph (d)(3) of this section for the each of the NHS bridge condition measures in § 490.105(c)(3); or

(v) The data were determined insufficient, as described in paragraphs (e)(4)(ii) through (iv) of this section, in the year in which the Baseline Period Performance Report is due to FHWA for the measures in § 490.105(c)(1) through (3).

(5) *Extenuating circumstances.* The FHWA will consider extenuating circumstances documented by the State DOT in the assessment of progress toward the achievement of NHPP and NHFP targets in the relevant State Biennial Performance Report, provided in § 490.107.

(i) The FHWA will classify the assessment of progress toward the achievement of an individual 2-year or 4-year target as “progress not determined” if the State DOT has provided an explanation of the extenuating circumstances beyond the control of the State DOT that prevented it from making significant progress toward the achievement of a 2-year or 4-year target and the State DOT has quantified the impacts on the condition/performance that resulted from the circumstances, which are:

(A) Natural or man-made disasters that caused delay in NHPP or NHFP project delivery, extenuating delay in data collection, and/or damage/loss of data system;

(B) Sudden discontinuation of Federal government furnished data due to natural and man-made disasters or sudden discontinuation of Federal government furnished data due to lack of funding; and/or

(C) New law and/or regulation directing State DOTs to change metric and/or measure calculation.

(ii) If the State DOT’s explanation, described in paragraph (e)(5)(i) of this section, is accepted by FHWA, FHWA will classify the progress toward achieving the relevant target(s) as “progress not determined,” and those targets will be excluded from the requirement in paragraph (e)(2) of this section.

(f) *Performance achievement.* (1) If FHWA determines that a State DOT has not made significant progress toward the achieving of NHPP targets, then the State DOT shall include as part of the next performance target report under 23 U.S.C. 150(e) [the Biennial Performance Report] a description of the actions the State DOT will undertake to achieve the targets related to the measure in which

significant progress was not achieved as follows:

(i) If significant progress is not made for either target established for the Interstate System pavement condition measures, § 490.307(a)(1) and (2), then the State DOT shall document the actions it will take to achieve Interstate Pavement condition targets;

(ii) If significant progress is not made for either target established for the Non-Interstate System pavement condition measures, § 490.307(a)(3) and (4), then the State DOT shall document the actions it will take to achieve Non-Interstate Pavement condition target;

(iii) If significant progress is not made for either target established for the NHS bridge condition measures, § 490.407(c)(1) and (2), then the State DOT shall document the actions it will take to achieve NHS bridge condition target;

(iv) If significant progress is not made for either target established for the Travel Time Reliability measures, § 490.507(a)(1) and (2), then the State DOT shall document the actions it will take to achieve the NHS travel time targets; and

(v) If significant progress is not made for the target established for the GHG measure described in § 490.507(b), then the State DOT shall document the actions it will take to achieve the target for the GHG measure.

(2) If FHWA determines that a State DOT has not made significant progress toward achieving the target established for the Freight Reliability measure in § 490.607, then the State DOT shall include as part of the next performance target report under 23 U.S.C. 150(e) [the Biennial Performance Report] the following:

(i) An identification of significant freight system trends, needs, and issues within the State.

(ii) A description of the freight policies and strategies that will guide the freight-related transportation investments of the State.

(iii) An inventory of truck freight bottlenecks within the State and a description of the ways in which the State DOT is allocating funding under title 23 U.S.C. to improve those bottlenecks.

(A) The inventory of truck freight bottlenecks shall include the route and milepost location for each identified bottleneck, roadway section inventory data reported in HPMS, Average Annual Daily Traffic (AADT), Average Annual Daily Truck Traffic (AADTT), Travel-time data and measure of delay, such as travel time reliability, or Average Truck Speeds, capacity feature causing the bottleneck or any other constraints

applicable to trucks, such as geometric constraints, weight limits or steep grades.

(B) For those facilities that are State-owned or operated, the description of the ways in which the State DOT is improving those bottlenecks shall include an identification of methods to address each bottleneck and improvement efforts planned or programed through the State Freight Plan or MPO freight plans; the Statewide Transportation Improvement Program and Transportation Improvement Program; regional or corridor level efforts; other related planning efforts; and operational and capital activities.

(iv) A description of the actions the State DOT will undertake to achieve the target established for the Freight Reliability measure in § 490.607.

(3) The State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this paragraph to ensure actions are being taken to achieve targets.

§ 490.111 Incorporation by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, FHWA must publish a notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Highway Policy Information (202-366-4631) 1200 New Jersey Avenue SE., Washington, DC 20590, www.fhwa.dot.gov and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(b) The Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, www.fhwa.dot.gov.

(1) Highway Performance Monitoring System (HPMS) Field Manual, IBR approved for §§ 490.103, 490.309, 490.311, and 490.319.

(2) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges, includes: Errata Sheet for Coding Guide 06/2011, Report No. FHWA-PD-96-001, December

1995, IBR approved for §§ 490.409 and 490.411.

(c) The American Association of State Highway and Transportation Officials, 444 North Capitol Street NW., Suite 249, Washington, DC 20001, (202) 624-5800, www.transportation.org.

(1) AASHTO Standard M328-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Inertial Profiler, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(2) AASHTO Standard R57-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Operating Inertial Profiling Systems, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(3) AASHTO Standard R48-10 (2013), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Rut Depth in Pavements, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(4) AASHTO Standard R36-13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Evaluating Faulting of Concrete Pavements, 2014, 34th/2014 Edition, IBR approved for § 490.309.

(5) AASHTO Standard R43-13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Roughness of Pavement, 2014, 34th/2014 Edition, IBR approved for § 490.311.

■ 3. Add subpart E to read as follows:

Subpart E—National Performance Management Measures To Assess Performance of the National Highway System

Sec.	
490.501	Purpose.
490.503	Applicability.
490.505	Definitions.
490.507	National performance management measures for system performance.
490.509	Data requirements.
490.511	Calculation of National Highway System performance metrics.
490.513	Calculation of National Highway System performance measures.

§ 490.501 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(3)(A)(ii)(IV) and (V) to establish performance measures for State Departments of Transportation (State DOTs) and Metropolitan Planning Organizations (MPOs) to use to assess:

(a) Performance of the Interstate System; and

(b) Performance of the non-Interstate National Highway System (NHS).

§ 490.503 Applicability.

(a) The performance measures are applicable to those portions of the mainline highways on the NHS as provided in paragraphs (a)(1) and (2) of this section (and in more detail in § 490.507):

(1) The Travel Time Reliability measures in § 490.507(a) are applicable to all directional mainline highways on the Interstate System and non-Interstate NHS.

(2) The Greenhouse Gas (GHG) measure in § 490.507(b) is applicable to all mainline highways on the Interstate and non-Interstate NHS.

(b) [Reserved]

§ 490.505 Definitions.

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this subpart, the following definitions apply to this subpart:

Greenhouse gas (GHG) is any gas that absorbs infrared radiation (traps heat) in the atmosphere. Ninety-five percent of transportation GHG emissions are carbon dioxide (CO₂) from burning fossil fuel. Other transportation GHGs are methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFCs).

Level of Travel Time Reliability is a comparison, expressed as a ratio, of the 80th percentile travel time of a reporting segment to the “normal” (50th percentile) travel time of a reporting segment occurring throughout a full calendar year.

Normal Travel Time (or 50th percentile travel time) is the time of travel to traverse the full extent of a reporting segment which is greater than the time for 50 percent of the travel in a calendar year to traverse the same reporting segment.

Travel time cumulative probability distribution means a representation of all the travel times for a road segment during a defined reporting period (such as annually) presented in a percentile ranked order as provided in the travel time data set. The normal (50th percentile) and 80th percentile travel times used to compute the Travel Time Reliability measures may be identified by the travel time cumulative probability distribution.

§ 490.507 National performance management measures for system performance.

There are three performance measures to assess the performance of the Interstate System and the performance of the non-Interstate NHS for the purpose of carrying out the National

Highway Performance Program (referred to collectively as the NHS Performance measures).

(a) Two measures are used to assess reliability (referred to collectively as the Travel Time Reliability measures). They are:

(1) Percent of the person-miles traveled on the Interstate that are reliable (referred to as the Interstate Travel Time Reliability measure); and

(2) Percent of person-miles traveled on the non-Interstate NHS that are reliable (referred to as the Non-Interstate Travel Time Reliability measure).

(b) One measure is used to assess GHG emissions, which is the percent change in tailpipe CO₂ emissions on the NHS compared to the calendar year 2017 level (referred to as the GHG measure).

§ 490.509 Data requirements.

(a) Travel time data needed to calculate the Travel Time Reliability measures in § 490.507(a) shall come from the travel time data set, as specified in § 490.103(e).

(1) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f). Reporting segments must be contiguous so that they cover the full extent of the mainline highways of the NHS in the State.

(2) [Reserved]

(b) State DOTs shall not replace missing travel times when data are not available in the travel time data set (data not reported, or reported as “0” or null) as specified in § 490.511(b)(1)(v).

(c) AADT needed to calculate the Travel Time Reliability measures will be used, as reported to HPMS in June of the reporting year, to assign an annual volume to each reporting segment. Annual volume will be calculated as: Annual Volume = AADT × 365 days

(d) The average occupancy factors for the State and/or metropolitan area (as applicable) needed to calculate Travel Time Reliability measures shall come from the most recently available data tables published by FHWA unless using other allowed data source(s).

(e) If an NHS roadway is closed, the State DOT is not required to include those time periods for those segments of road in the calculations required for the Level of Travel Time Reliability (LOTTR) metric (see § 490.511(a)(1)).

(f) The FHWA will post on the FHWA Web site the tailpipe CO₂ emissions factors State DOTs and MPOs shall use in the calculation.

(g) Fuel sales information needed to calculate the GHG measure in § 490.507(b) shall come from either of the following two sources:

(1) The most recent final annual fuel sales data posted on the Web site by FHWA in Highway Statistics under “Motor Fuel Use (MF–21)” as of August 15th of the HPMS reporting year (<https://www.fhwa.dot.gov/policyinformation/statistics.cfm>); or

(2) The State DOT’s fuel sales data used to create the summary data included in FHWA’s MF–21, if it allows for a greater level of detail by fuel type. State DOTs shall make this data available to FHWA, upon request.

(h) Final annual vehicle miles traveled (VMT) needed to calculate the GHG measure in § 490.507(b) shall come from the most recently available data posted by FHWA in Highway Statistics in Table VM–3, “Federal-Aid Highway Travel” as of August 15th of the HPMS reporting year.

§ 490.511 Calculation of National Highway System performance metrics.

(a) Two performance metrics are required for the NHS Performance measures specified in § 490.507. These are:

(1) Level of Travel Time Reliability (LOTTR) for the Travel Time Reliability measures in § 490.507(a) (referred to as the LOTTR metric).

(2) Annual Total Tailpipe CO₂ Emissions on the NHS for the GHG

measure in § 490.507(b) (referred to as the GHG metric).

(b) The State DOT shall calculate the LOTTR metrics for each NHS reporting segment in accordance with the following:

(1) Data sets shall be created from the travel time data set to be used to calculate the LOTTR metrics. This data set shall include, for each reporting segment, a ranked list of average travel times for all traffic (“all vehicles” in NPMRDS nomenclature), to the nearest second, for 15 minute periods of a population that:

(i) Includes travel times occurring between the hours of 6 a.m. and 10 a.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(ii) Includes travel times occurring between the hours of 10 a.m. and 4 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iii) Includes travel times occurring between the hours of 4 p.m. and 8 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year; and

(iv) Includes travel times occurring between the hours of 6: a.m. and 8: p.m. for every weekend day (Saturday–

Sunday) from January 1st through December 31st of the same year.

(2) The Normal Travel Time (50th percentile) shall be determined from each data set defined under paragraph (b)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 80th percentile travel time shall be determined for each data set defined under paragraph (b)(1) of this section as the time in which 80 percent of the times in the data set are shorter in duration and 20 percent are longer in duration. Both the Normal and 80th percentile travel times can be determined by plotting the data on a travel time cumulative probability distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) Four LOTTR metrics shall be calculated for each reporting segment; one for each data set defined under paragraph (b)(1) of this section as the 80th percentile travel time divided by the 50th percentile travel time and rounded to the nearest hundredth.

(c) Tailpipe CO₂ emissions on the NHS for a given year are calculated as follows:

$$(\text{Tailpipe CO}_2 \text{ Emissions on NHS})_{CY} = \left(\sum_{t=1}^T (\text{Fuel Consumed})_t \times (\text{CO}_2 \text{ Factor})_t \right) \times \left(\frac{\text{NHS VMT}}{\text{Total VMT}} \right)$$

Where:

(Tailpipe CO₂ Emissions on NHS)_{CY} = Total tailpipe CO₂ emissions on the NHS in a calendar year (to the nearest thousand tons);

T = the total number of on-road fuel types;
t = an on-road fuel type;

(Fuel Consumed)_t = the quantity of total annual fuel consumed for on-road fuel type “t” (to the nearest thousand gallons);

(CO₂ Factor)_t = is the amount of CO₂ released per unit of fuel consumed for on-road fuel type “t”;

NHS VMT = annual total vehicle-miles traveled on NHS (to the nearest one million vehicle-miles); and

Total VMT = annual total vehicle-miles traveled on all public roads (to the nearest one million vehicle-miles).

(d) For the GHG measure listed in § 490.507(b), MPOs are granted additional flexibility in how they calculate the GHG metric. MPOs may use the MPO share of the State’s VMT as a proxy for the MPO share of CO₂ emissions, VMT estimates along with

MOVES² emissions factors, FHWA’s Energy and Emissions Reduction Policy Analysis Tool (EERPAT) model, or other method the MPO can demonstrate has valid and useful results for CO₂ measurement.

(e) Starting in 2018 and annually thereafter, State DOTs shall report the LOTTR metrics, defined in paragraph (b) of this section, in accordance with HPMS Field Manual by June 15th of each year for the previous year’s measures.

(1) Metrics are reported to HPMS by reporting segment. All reporting segments where the NPMRDS is used shall be referenced by NPMRDS TMC(s) or HPMS section(s). If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS section(s); and

² MOVES (Motor Vehicle Emission Simulator) is EPA’s emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics. See <https://www.epa.gov/moves>.

(2) The LOTTR metric (to the nearest hundredths) for each of the four time periods identified in paragraphs (b)(1)(i) through (iv) of this section: the corresponding 80th percentile travel times (to the nearest second), the corresponding Normal (50th percentile) Travel Times (to the nearest second), and directional AADTs. If a State DOT does not elect to use FHWA supplied occupancy factor, as provided in § 490.507(d), that State DOT shall report vehicle occupancy factor (to the nearest tenth) to HPMS.

(f) Starting in 2018 and biennially thereafter, State DOTs shall report, as required in § 490.107, the GHG metrics, defined in paragraph (c) of this section. Specifically, the following GHG metric shall be reported in the State Biennial Performance Reports, as required in § 490.107:

(1) Total tailpipe CO₂ emissions, as specified in paragraph (c) of this section, generated by on-road sources travelling on the NHS (the GHG metric), and total on-road CO₂ emissions (the step in the calculation prior to

computing the GHG metric), in each of the following calendar years:

(i) 2017 (reported in 2018, unless FHWA states on its Web site, noted in § 490.509 (f), that there has been a change sufficient to warrant recalculation of the 2017 value); and

(ii) The 2 years preceding the reporting years.

(2) [Reserved]

§ 490.513 Calculation of National Highway System performance measures.

(a) The NHS Performance measures in § 490.507 shall be calculated in accordance with this section by State DOTs and MPOs to carry out the Interstate System and non-Interstate NHS performance-related requirements

of this part, and by FHWA to make the significant progress determinations specified in § 490.109 and to report on system performance.

(b) The Interstate Travel Time Reliability measure specified in § 490.507(a)(1) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i \times AV_i \times OF_j}{\sum_{i=1}^T SL_i \times AV_i \times OF_j}$$

Where:

R = total number of Interstate System reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);

I = Interstate System reporting segment “i”;

SL_i = length, to the nearest thousandth of a mile, of Interstate System reporting segment “i”;

AV_i = total annual traffic volume to the nearest single vehicle, of the Interstate System reporting segment “i”;

J = geographic area in which the reporting segment “i” is located where a unique occupancy factor has been determined;

OF_i = occupancy factor for vehicles on the NHS within a specified geographic area within the State/Metropolitan planning area; and

T = total number of Interstate System reporting segments.

(c) The Non-Interstate Travel Time Reliability measure specified in § 490.507(a)(2) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^R SL_i \times AV_i \times OF_j}{\sum_{i=1}^T SL_i \times AV_i \times OF_j}$$

Where:

R = total number of non-Interstate NHS reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);

i = non-Interstate NHS reporting segment “i”;

SL_i = length, to the nearest thousandth of a mile, of non-Interstate NHS reporting segment “i”;

AV_i = total annual traffic volume to the nearest 1 vehicle, of the Interstate System reporting segment “i”;

j = geographic area in which the reporting segment “i” is located where a unique occupancy factor has been determined;

OF_j = occupancy factor for vehicles on the NHS within a specified geographic area within the State/Metropolitan planning area; and

T = total number of non-Interstate NHS reporting segments.

(d) The GHG measure specified in § 490.507(b) shall be computed to the nearest tenth of a percent as follows:

$$\frac{(\text{Tailpipe CO}_2\text{Emissions on NHS})_{CY} - (\text{Tailpipe CO}_2\text{Emissions on NHS})_{2017}}{(\text{Tailpipe CO}_2\text{Emissions on NHS})_{2017}} \times 100$$

Where:

(Tailpipe CO₂ Emissions on NHS)_{CY} = total tailpipe CO₂ emissions on the NHS in a calendar year (to the nearest thousand tons); and

(Tailpipe CO₂ Emissions on NHS)₂₀₁₇ = total tailpipe CO₂ emissions on the NHS in the calendar year 2017 (to the nearest thousand tons).

■ 4. Add subpart F to read as follows:

Subpart F—National Performance Management Measures To Assess Freight Movement on the Interstate System

Sec.

490.601 Purpose.

490.603 Applicability.

490.605 Definitions.

490.607 National performance management measures to assess freight movement on the Interstate System.

490.609 Data requirements.

490.611 Calculation of Truck Travel Time Reliability metrics.

490.613 Calculation of Freight Reliability measure.

§ 490.601 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(6) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use to assess the national freight movement on the Interstate System.

§ 490.603 Applicability.

The performance measures to assess the national freight movement are applicable to the Interstate System.

§ 490.605 Definitions.

The definitions in § 490.101 apply to this subpart.

§ 490.607 National performance management measures to assess freight movement on the Interstate System.

The performance measure to assess freight movement on the Interstate System is the: Truck Travel Time Reliability (TTTR) Index (referred to as the Freight Reliability measure).

§ 490.609 Data requirements.

(a) Travel time data needed to calculate the Freight Reliability measure in § 490.607 shall come from the travel time data set, as specified in § 490.103(e).

(b) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the Interstate in the State.

(c) When truck travel times are not available in the travel time data set (data not reported, or reported as “0” or null) as specified in § 490.611(a)(1)(ii) for a given 15 minute interval, State DOTs shall replace the missing travel time with an observed travel time that represents all traffic on the roadway during the same 15 minute interval (“all vehicles” in NPMRDS nomenclature).

(d) If an NHS roadway is closed, the State DOT is not required to include those time periods for those segments of

road in the calculations required for the Freight Reliability metric/measure.

§ 490.611 Calculation of Truck Travel Time Reliability metrics.

(a) The State DOT shall calculate the TTTR Index metric (referred to as the TTTR metric) for each Interstate System reporting segment in accordance with the following:

(1) A truck travel time data set shall be created from the travel time data set to be used to calculate the TTTR metric. This data set shall include, for each reporting segment, a ranked list of average truck travel times, to the nearest second, for 15 minute periods of a 24-hour period for an entire calendar year that:

(i) Includes “AM Peak” travel times occurring between the hours of 6 a.m. and 10 a.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(ii) Includes “Mid Day” travel times occurring between the hours of 10 a.m. and 4 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iii) Includes “PM Peak” travel times occurring between the hours of 4 p.m. and 8 p.m. for every weekday (Monday–Friday) from January 1st through December 31st of the same year;

(iv) Includes “Overnight” travel times occurring between the hours of 8 p.m. and 6 a.m. for every day (Sunday–Saturday) from January 1st through December 31st of the same year; and

(v) Includes “Weekend” travel times occurring between the hours of 6 a.m. and 8 p.m. for every weekend day (Saturday–Sunday) from January 1st through December 31st of the same year.

(2) The Normal Truck Travel Time (50th percentile) shall be determined from each of the truck travel time data sets defined under paragraph (a)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 95th percentile truck travel time shall be determined from each of the truck travel time data sets defined under paragraph (a)(1) of this section as the time in which 95 percent of the times in the data set are shorter in duration. Both the Normal and 95th percentile truck travel times can be determined by plotting the data on a travel time cumulative probability distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) Five TTTR metrics shall be calculated for each reporting segment; one for each data set defined under paragraph (a)(1) of this section as the 95th percentile travel time divided by

the Normal Truck Travel Time and rounded to the nearest hundredth.

(b) Starting in 2018 and annually thereafter, State DOTs shall report the TTTR metrics, as defined in this section, in accordance with the HPMS Field Manual by June 15th of each year for the previous year’s Freight Reliability measures.

(1) All metrics shall be reported to HPMS by reporting segments. When the NPMRDS is used metrics shall be referenced by NPMRDS TMC(s) or HPMS section(s). If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS section(s).

(2) The TTTR metric shall be reported to HPMS for each reporting segment (to the nearest hundredths) for each of the five time periods identified in paragraphs (a)(1)(i) through (v) of this section; the corresponding 95th percentile travel times (to the nearest second) and the corresponding normal (50th percentile) travel times (to the nearest second).

§ 490.613 Calculation of Freight Reliability measure.

(a) The performance for freight movement on the Interstate in § 490.607 (the Freight Reliability measure) shall be calculated in accordance with this section by State DOTs and MPOs to carry out the freight movement on the Interstate System related requirements of this part, and by FHWA to make the significant progress determinations specified in § 490.109 and to report on freight performance of the Interstate System.

(b) The Freight Reliability measure shall be computed to the nearest hundredth as follows:

$$\frac{\sum_{i=1}^T (SL_i \times \max TTTR_i)}{\sum_{i=1}^T (SL_i)}$$

Where:

i = An Interstate System reporting segment;
 $\max TTTR_i$ = The maximum TTTR of the five time periods in paragraphs (a)(1)(i) through (v) of § 490.611, to the nearest hundredth, of Interstate System reporting segment “i”;

SL_i = Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment “i”; and
 T = A total number of Interstate System reporting segments.

■ 5. Add subpart G to read as follows:

Subpart G—National Performance Management Measure for Assessing the Congestion Mitigation and Air Quality Improvement Program—Traffic Congestion

Sec.

- 490.701 Purpose.
- 490.703 Applicability.
- 490.705 Definitions.
- 490.707 National performance management measure for traffic congestion.
- 490.709 Data requirements.
- 490.711 Calculation of Peak Hour Excessive Delay metric.
- 490.713 Calculation of Traffic Congestion measures.

§ 490.701 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(A) to establish performance measures for State DOTs and the MPOs to use in assessing CMAQ Traffic Congestion for the purpose of carrying out the CMAQ program.

§ 490.703 Applicability.

The CMAQ Traffic Congestion performance measures are applicable to all urbanized areas that include NHS mileage and with a population over 1 million for the first performance period and in urbanized areas with a population over 200,000 for the second and all other performance periods, that are, in all or part, designated as nonattainment or maintenance areas for ozone (O₃), carbon monoxide (CO), or particulate matter (PM₁₀ and PM_{2.5}) National Ambient Air Quality Standards (NAAQS).

§ 490.705 Definitions.

All definitions in § 490.101 apply to this subpart. Unless otherwise specified, the following definitions apply in this subpart:

Excessive delay means the extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay threshold. For the purposes of this rule, the speed threshold is 20 miles per hour (mph) or 60 percent of the posted speed limit, whichever is greater.

Peak Period is defined as weekdays from 6 a.m. to 10 a.m. and either 3 p.m. to 7 p.m. or 4 p.m. to 8 p.m. State DOTs and MPOs may choose whether to use 3 p.m. to 7 p.m. or 4 p.m. to 8 p.m.

§ 490.707 National performance management measures for traffic congestion.

There are two performance measures to assess traffic congestion for the purpose of carrying out the CMAQ program (referred to collectively as the CMAQ Traffic Congestion measures). They are:

- (a) Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita (referred to as the PHED measure); and
- (b) Percent of Non-SOV Travel.

§ 490.709 Data requirements.

(a) Travel time data needed to calculate the PHED measure in § 490.707(a) shall come from the travel time data set, as specified in § 490.103(e).

(b) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the NHS in the urbanized area(s).

(c) State DOTs shall develop hourly traffic volume data for each reporting segment as follows:

(1) State DOTs shall measure or estimate hourly traffic volumes for Peak Periods on each weekday of the reporting year by using either paragraph (c)(1)(i) or (ii) of this section.

(i) State DOTs may use hourly traffic volume counts collected by continuous count stations and apply them to multiple reporting segments; or

(ii) State DOTs may use Annual Average Daily Traffic (AADT) reported to the HPMS to estimate hourly traffic volumes when no hourly volume counts exist. In these cases the AADT data used should be the most recently available, but not more than 2 years older than the reporting period (e.g., if reporting for calendar year 2018, AADT should be from 2016 or 2017) and should be split to represent the appropriate direction of travel of the reporting segment.

(2) State DOTs shall assign hourly traffic volumes to each reporting segment by hour (e.g., between 8 a.m. and 8:59 a.m.).

(3) State DOTs shall report the methodology they use to develop hourly traffic volume estimates to FHWA no later than 60 days before the submittal of the first Baseline Performance Period Report.

(4) If a State DOT elects to change the methodology it reported under paragraph (c)(3) of this section, then the State DOT shall submit the changed methodology no later than 60 days before the submittal of next State Biennial Performance Report required in § 490.107(b).

(5) If an NHS roadway is closed, the State DOT is not required to include those time periods for the segment of road in the calculation required for this metric and measure.

(d) State DOTs shall develop annual vehicle classification data for each reporting segment using data as follows:

(1) State DOTs shall measure or estimate the percentage of cars, buses, and trucks, relative to total AADT for each segment using either paragraph (d)(1)(i) or (ii) of this section.

(i) State DOTs may use annual traffic volume counts collected by continuous count stations to estimate the annual percent share of traffic volumes for cars, buses, and trucks for each segment; or

(ii) State DOTs may use AADT reported to the HPMS to estimate the annual percent share of traffic volumes for cars, buses, and trucks, where:

(A) Buses = value in HPMS Data Item "AADT_Single_Unit";

(B) Trucks = value in HPMS Data Item "AADT_Combination"; and

(C) Cars = subtract values for Buses and Trucks from the value in HPMS Data Item "AADT".

(iii) If a State DOT uses the data reported to the HPMS in paragraph (d)(1)(ii) of this section, then the data values should be split to represent the appropriate direction of travel of the reporting segment.

(2) State DOTs shall report the methodology they use to develop annual percent share of traffic volume by vehicle class to FHWA no later than 60 days before the submittal of the first Baseline Performance Period Report.

(3) If a State DOT elects to change the methodology it reported under paragraph (d)(2) of this section, then the State DOT shall submit the changed methodology no later than 60 days before the submittal of next State Biennial Performance Report required in § 490.107(b).

(e) State DOTs shall develop annual average vehicle occupancy (AVO) factors for cars, buses, and trucks in applicable urbanized areas using either method under paragraph (e)(1)(i) or (ii) of this section.

(1) State DOTs shall measure or estimate annual vehicle occupancy factors for cars, buses, and trucks in applicable urbanized areas.

(i) State DOTs shall use estimated annual vehicle occupancy factors for cars, buses, and trucks in urbanized areas provided by FHWA; and/or

(ii) State DOTs may use an alternative estimate of annual vehicle occupancy factors for a specific reporting segment(s) for cars, buses, and trucks in urbanized areas, provided that it is more specific than the data provided by FHWA.

(f) All State DOTs and MPOs contributing to the unified target for the applicable area as specified in § 490.105(d)(2) shall agree to using one of the methods specified in paragraph (f)(1)(i), (ii), or (iii) of this section to identify the data that will be used to determine the Percent of Non-SOV Travel for the applicable urbanized area.

(1) The data to determine the Percent of Non-SOV Travel measure shall be

developed using any one of the following methods.

(i) *Method A—American Community Survey.* Populations by predominant travel to commute to work may be identified from Table DP03 of the American Community Survey using the totals by transportation mode listed within the "Commuting to Work" subject heading under the "Estimate" column of the table. The "5 Year Estimate" DP03 table using a geographic filter that represents the applicable "Urban Area" shall be used to identify these populations. The Percent of Non-SOV Travel measure shall be developed from the most recent data as of August 15th of the year in which the State Biennial Performance Report is due to FHWA.

(ii) *Method B—local survey.* The Percent of Non-SOV Travel may be estimated from a local survey focused on either work travel or household travel for the area and conducted as recently as 2 years before the beginning of the performance period. The survey method shall estimate travel mode choice for the full urbanized area using industry accepted methodologies and approaches resulting in a margin of error that is acceptable to industry standards, allow for updates on at least a biennial frequency, and distinguish non-SOV travel occurring in the area as a percent of all work or household travel.

(iii) *Method C—system use measurement.* The volume of travel using surface modes of transportation may be estimated from measurements of actual use of each transportation mode. Sample or continuous measurements may be used to count the number of travelers using different surface modes of transportation. The method used to count travelers shall estimate the total volume of annual travel for the full urbanized area within a margin of error that is acceptable to industry standards and allows for updates on at least a biennial frequency. The method shall include sufficient information to calculate the amount of non-SOV travel occurring in the area as a percentage of all surface transportation travel. State DOTs are encouraged to report use counts to FHWA that are not included in currently available national data sources.

(2) State DOTs shall report the data collection method that is used to determine the Percent of Non-SOV Travel measure for each applicable urbanized area in the State to FHWA in their first Baseline Performance Period Report required in § 490.107(b)(1). The State DOT shall include sufficient detail to understand how the data are

collected if either Method B or Method C are used for the urbanized area. This method shall be used for the full performance period for each applicable urbanized area.

(3) If State DOTs and MPOs that contribute to an applicable urbanized area elect to change the data collection method reported under paragraph (f)(2) of this section, then each respective State DOT shall report this change in their next Baseline Performance Report required in § 490.107(b)(1). The new method reported as a requirement of this paragraph shall not be used until the beginning of the next performance period for the Baseline Performance Report in which the method was reported to be changed.

(g) Populations of urbanized areas shall be as identified based on the most recent annual estimates published by the U.S. Census available 1 year before the State DOT Baseline Performance Period Report is due to FHWA to identify applicability of the CMAQ Traffic Congestion measures in § 490.707(a) and (b) for each performance period, as described in § 490.105(e)(8)(iii)(D) and (f)(5)(iii)(D). For computing the PHED measure in § 490.713(b), the most recent annual

population estimate published by the U.S. Census, at the time when the State DOT Biennial Performance Period Report is due to FHWA shall be used.

(h) Nonattainment and maintenance area determinations for the CMAQ Traffic Congestion measures:

(1) The CMAQ Traffic Congestion measures apply to nonattainment and maintenance areas. Such areas shall be identified based on the effective date of U.S. EPA's designations under the NAAQS in 40 CFR part 81, as of the date 1 year before the State DOT Baseline Performance Period Report is due to FHWA.

(2) The nonattainment and maintenance areas to which the CMAQ Traffic Congestion measures applies shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA, the area is no longer in nonattainment or maintenance for a criteria pollutant included in § 490.703.

§ 490.711 Calculation of Peak Hour Excessive Delay metric.

(a) The performance metric required to calculate the measure specified in § 490.707(a) is Total Peak Hour Excessive Delay (person-hours)(referred to as the PHED metric). The following

paragraphs explain how to calculate this PHED metric.

(b) State DOTs shall use the following data to calculate the PHED metric:

(1) Travel times of all traffic ("all vehicles" in NPMRDS nomenclature) during each 15 minute interval for all applicable reporting segments in the travel time data set occurring for peak periods from January 1st through December 31st of the same year;

(2) The length of each applicable reporting segment, reported as required under § 490.709(b);

(3) Hourly volume estimation for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(c);

(4) Annual vehicle classification data for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(d); and

(5) Annual vehicle occupancy factors for cars, buses, and trucks for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(e).

(c) The State DOT shall calculate the "excessive delay threshold travel time" for all applicable travel time segments as follows:

Excessive Delay Threshold Travel Time_s

$$= \left(\frac{\text{Travel Time Segment Length}_s}{\text{Threshold Speed}_s} \right) \times 3,600$$

Where:

Excessive Delay Threshold Travel Time_s = the time of travel, to the nearest whole second, to traverse the Travel Time Segment at which any longer measured travel times would result in excessive delay for the travel time segment "s";

Travel Time Segment Length_s = total length of travel time segment to the nearest thousandth of a mile for travel time reporting segment "s"; and

Threshold Speed_s = the speed of travel at which any slower measured speeds would result in excessive delay for travel time reporting segment "s." As defined in § 490.705, the speed threshold is 20 miles per hour (mph) or 60 percent of the posted speed limit travel time reporting segment "s," whichever is greater.

(d) State DOTs shall determine the "excessive delay" for each 15 minute

bin of each reporting segment for every hour and every day in a calendar year as follows:

(1) The travel time segment delay (RSD) shall be calculated to the nearest whole second as follow:

$$RSD_{s,b} - \text{Excessive Delay Threshold Travel Time}_s \text{ and } RSD_{s,b} \leq 900 \text{ seconds}$$

Where:

RSD_{s,b} = travel time segment delay, calculated to the nearest whole second, for a 15-minute bin "b" of travel time reporting segment "s" for in a day in a calendar year. RSD(s)_b not to exceed 900 seconds;

Travel time_{s,b} = a measured travel time, to the nearest second, for 15-minute time bin "b" recorded for travel time reporting segment "s";

Excessive Delay Threshold Travel Time_s =

The maximum amount of time, to the nearest second, for a vehicle to traverse through travel time segment "s" before excessive delay would occur, as specified in paragraph (c) of this section;

b = a 15-minute bin of a travel time reporting segment "s"; and

s = a travel time reporting segment.

(2) Excessive delay, the additional amount of time to traverse a travel time segment in a 15-minute bin as compared to the time needed to traverse the travel time segment when traveling at the excessive delay travel speed threshold, shall be calculated to the nearest thousandths of an hour as follows:

$$\text{Excessive Delay}_{s,b} = \begin{cases} \frac{RSD_{s,b}}{3,600} & \text{when } RSD_{s,b} \geq 0 \\ \text{or} \\ 0 & \text{when } RSD_{s,b} < 0 \end{cases}$$

Where:
 Excessive Delay_{s,b} = excessive delay, calculated to the nearest thousandths of an hour, for 15-minute bin “b” of travel time reporting segment “s”;

RSD_{s,b} = the calculated travel time reporting segment delay for fifteen minute bin “b” of a travel time reporting segment “s,” as described in paragraph (d)(1) of this section;
 b = a fifteen minute bin of a travel time reporting segment “s”; and

s = a travel time reporting segment.
 (e) State DOTs shall use the hourly traffic volumes as described in § 490.709(c) to calculate the PHED metric for each reporting segment as follows:

Total Excessive Delay_s

$$= AVO \times \sum_{d=1}^{TD} \left\{ \sum_{h=1}^{TH} \left[\sum_{b=1}^{TB} \left(Excessive\ Delay_{s,b,h,d} \times \left(\frac{hourly\ volume}{4} \right)_{s,h,d} \right) \right] \right\}_d$$

Where:
 Total Excessive Delay_s (in person-hours) = the sum of the excessive delay, to the nearest thousandths, for all traffic traveling through single travel time reporting segment “s” on NHS within an urbanized area, specified in § 490.703, accumulated over the full reporting year;
 AVO = Average Vehicle Occupancy;
 s = a travel time reporting segment;
 d = a day of the reporting year;

TD = total number of days in the reporting year;
 h = single hour interval of the day where the first hour interval is 12 a.m. to 12:59 a.m.;
 TH = total number of hour intervals in day “h”;
 b = 15-minute bin for hour interval “h”;
 TB = total number of 15-minute bins where travel times are recorded in

the travel time data set for hour interval “h”;
 Excessive Delay_{s,b,h,d} = calculated excessive travel time, in hundredths of an hour, for 15 minute bin (b), hour interval (h), day (d), and travel time segment (s), as described in paragraph (d)(2) of this section; and

$$\left(\frac{hourly\ volume}{4} \right)_{s,hd}$$

Where the equation equals hourly traffic volume, to the nearest tenth, for hour interval “h” and day “d” that corresponds to 15-minute bin “b” and travel time reporting segment “s” divided by 4. For example, the 9 a.m. to 9:15 a.m. minute bin would be assigned one fourth of the hourly traffic volume for the 9 a.m. to 9:59 a.m. hour on the roadway in which travel time segment is included;

$$AVO = (P_C \times AVO_C) + (P_B \times AVO_B) + (P_T \times AVO_T)$$

Where:
 P_C = the percent of cars as a share of total AADT on the segment as specified in § 490.709(d);
 P_B = the percent of buses as a share of total AADT on the segment as specified in § 490.709(d);
 P_T = the percent of trucks as a share of total AADT on the segment as specified in § 490.709(d);

AVO_C = the average vehicle occupancy of cars as specified in § 490.709(e);
 AVO_B = the average vehicle occupancy of buses as specified in § 490.709(e); and
 AVO_T = the average vehicle occupancy of trucks as specified in § 490.709(e).

(f) Starting in 2018 and annually thereafter, State DOTs shall report the PHED metric (to the nearest one hundredth hour) in accordance with HPMS Field Manual by June 15th of each year for the previous year’s PHED measures. The PHED metric shall be reported for each reporting segment. All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC or HPMS section(s). If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segments shall be referenced by HPMS sections.

§ 490.713 Calculation of Traffic Congestion measures.

(a) The performance measures in § 490.707 shall be computed in accordance with this section by State DOTs and MPOs to carry out CMAQ traffic congestion performance-related requirements of this part and by FHWA to report on traffic congestion performance.

(b) The performance measure for CMAQ traffic congestion specified in § 490.707, Annual Hours of Peak Hour Excessive Delay Per Capita (the PHED measure), shall be computed to the nearest tenth, and by summing the PHED metrics of all reporting segments in each of the urbanized area, specified in § 490.703, and dividing it by the population of the urbanized area to produce the PHED measure. The equation for calculating the PHED measure is as follows:

Annual Hours of Peak Hour Excessive Delay per Capita

$$= \frac{\sum_{s=1}^T \text{Total Excessive Delays}_s}{\text{Total Population}}$$

Where:

Annual Hours of Peak Hour Excessive Delay per Capita = the cumulative hours of excessive delay, to the nearest tenth, experienced by all people traveling through all reporting segments during peak hours in the applicable urbanized area for the full reporting calendar year;

s = travel time reporting segment within an urbanized area, specified in § 490.703;

T = total number of travel time reporting segments in the applicable urbanized area;

Total Population = total hours of excessive delay in § 490.711(e) for all people traveling through travel time reporting segment "s" during a calendar year (as defined in § 490.711(f)); and

Total Population = the total population in the applicable urbanized area from the most recent annual population published by the U.S. Census at the time that the State Biennial Performance Period Report is due to FHWA.

(c) Calculation for the PHED measure, described in paragraph (b) of this section, and target establishment for the measure shall be phased-in under the

requirements in § 490.105(e)(8)(vi) and (f)(5)(vi).

(d) The performance measure for CMAQ traffic congestion specified in § 490.707(b), Percent of Non-SOV Travel, shall be computed as specified in paragraphs (d)(1) through (3) of this section corresponding to the method reported by the State DOT to collect travel data for the applicable area under § 490.709(f)(2).

(1) *Method A—American Community Survey.* The Percent of Non-SOV Travel shall be calculated to the nearest tenth of a percent using the following formula:

$$\text{Percent of Non-SOV Travel} = 100\% - \% \text{ SOV}$$

Where:

Percent of Non-SOV Travel = percent of commuting working population, to the nearest tenth of a percent, that predominantly do not commute by driving alone in a car, van, or truck,

including travel avoided by telecommuting; and

% SOV = percent estimate for "Car, truck, or van—drive alone".

(2) *Method B—local survey.* The Percent of Non-SOV Travel shall be calculated using the data derived from local survey results as specified in § 490.709(f)(1)(ii). The Percent of Non-SOV Travel measure shall be calculated to represent travel that is not occurring by driving alone in a motorized vehicle, including travel avoided by telecommuting, as a percentage of all surface transportation occurring in the applicable area. The Percent of Non-SOV Travel measure shall be calculated to the nearest tenth of a percent.

(3) *Method C—system use measurement.* The Percent of Non-SOV Travel shall be calculated to the nearest tenth of a percent from the data collected from system use measurements as specified in § 490.709(f)(1)(iii) using the general form of the following formula:

$$\text{Percent of Non-SOV Travel} = 100 \times \left(\frac{\text{Volume}_{\text{non-sov}}}{(\text{Volume}_{\text{non-sov}}) + (\text{Volume}_{\text{SOV}})} \right)$$

Where:

Percent of Non-SOV Travel = percentage of travel, to the nearest tenth of a percent, that is not occurring by driving alone in a motorized vehicle, including travel avoided by telecommuting

Volume_{non-sov} Volume = Annual volume of person travel occurring while driving alone in a motorized vehicle; and

Volume_{SOV} = Annual volume of person travel occurring on modes other than driving alone in a motorized vehicle, calculated as:

$$\sum_{m=1}^t \text{Volume}_m$$

Where:

m = travel mode (modes other than driving alone in a motorized vehicle, including travel avoided by telecommuting);

Volume_m = annual volume of person travel for each mode, "m"; and

t = total number of modes that are not driving alone in a motorized vehicle.

■ 6. Add a new subpart H to read as follows:

Subpart H- National Performance Management Measures to Assess the Congestion Mitigation and Air Quality Improvement Program—On-Road Mobile Source Emissions

Sec.

490.801 Purpose.

490.803 Applicability.

490.805 Definitions.

490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.

490.809 Data requirements.

490.811 Calculation of Total Emissions Reduction measure.

§ 490.801 Purpose.

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(B) to establish performance measures for State DOTs and the MPOs to use in assessing on-road mobile source emissions.

§ 490.803 Applicability.

(a) The on-road mobile source emissions performance measure (called the Total Emissions Reduction- see

§ 490.807) is applicable to all States and MPOs with projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs for areas designated as nonattainment or maintenance for ozone (O₃), carbon monoxide (CO), or particulate matter (PM₁₀ and PM_{2.5}) National Ambient Air Quality Standards (NAAQS).

(b) This performance measure does not apply to States and MPOs that do not contain any portions of nonattainment or maintenance areas for the criteria pollutants identified in paragraph (a) of this section.

§ 490.805 Definitions.

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this subpart, the following definitions apply in this subpart:

On-road mobile source means, within this part, emissions created by all projects and sources financed with funds from the 23 U.S.C. 149 CMAQ program.

§ 490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.

The performance measure for the purpose of carrying out the CMAQ Program and for State DOTs to use to assess on-road mobile source emissions is “Total Emissions Reduction,” which is the 2-year and 4-year cumulative reported emission reductions, for all projects funded by CMAQ funds, of each criteria pollutant and applicable precursors (PM_{2.5}, PM₁₀, CO, VOC, and NO_x) under the CMAQ program for which the area is designated nonattainment or maintenance.

§ 490.809 Data requirements.

(a) The data needed to calculate the Total Emission Reduction measure shall come from the CMAQ Public Access System and includes:

- (1) The applicable nonattainment or maintenance area;
- (2) The applicable MPO; and

(3) The emissions reduction estimated for each CMAQ funded project for each of the applicable criteria pollutants and their precursors for which the area is nonattainment or maintenance.

(b) The State DOT shall:

(1) Enter project information into the CMAQ project tracking system for each CMAQ project funded in the previous fiscal year by March 1st of the following fiscal year; and

(2) Extract the data necessary to calculate the Total Emissions Reduction measures as it appears in the CMAQ Public Access System on July 1st for projects obligated in the prior fiscal year.

(c) Nonattainment and maintenance area determinations for the CMAQ Total Emissions Reduction measure:

(1) The CMAQ Total Emissions Reduction measure applies to nonattainment and maintenance areas. Such areas shall be identified based on the effective date of U.S. EPA’s designations under the NAAQS in 40 CFR part 81, as of the date 1 year before

the State DOT Baseline Performance Period Report is due to FHWA.

(2) The nonattainment and maintenance areas to which the Total Emissions Reduction measure applies shall be revised if, on the date 1 year before the State DOT Mid Performance Period Progress Report is due to FHWA, the area is no longer in nonattainment or maintenance for a pollutant included in § 490.803.

§ 490.811 Calculation of Total Emissions Reduction measure.

(a) The Total Emission Reductions performance measure specified in § 490.807 shall be calculated in accordance with this section by State DOTs and MPOs to carry out CMAQ on-road mobile source emissions performance-related requirements of this part.

(b) The Total Emission Reductions measure for each of the criteria pollutant or applicable precursor for all projects reported to the CMAQ Public Access System shall be calculated to the nearest one thousandths, as follows:

$$Total\ Emission\ Reduction_p$$

$$= \sum_{i=1}^T Daily\ Kilograms\ of\ Emission\ Reductions_{p,i}$$

Where:

i = applicable projects reported in the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in in § 490.105(e)(4)(i)(B);
 p = criteria pollutant or applicable precursor: PM_{2.5}, PM₁₀, CO, VOC, or NO_x;
 Daily Kilograms of Emission Reductions_{p,i} = total daily kilograms, to the nearest one

thousandths, of reduced emissions for a criteria pollutant or an applicable precursor “p” in the in the first year the project is obligated;
 T = total number of applicable projects reported to the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in § 490.105(e)(4)(i)(B); and

Total Emission Reduction_p = cumulative reductions in emissions over 2 and 4 Federal fiscal years, total daily kilograms, to the nearest one thousandths, of reduced emissions for criteria pollutant or precursor “p.”

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