FAMPO RESOLUTION 19-53

ADMINISTRATIVE MODIFICATION TO THE FAMPO 2045 CONSTRAINED LONG-RANGE PLAN (CLRP) AND TRANSPORTATION IMPROVEMENT PLAN (TIP) TO BE COMPLIANT WITH MAP-21/FAST ACT PERFORMANCE-BASED PLANNING AND PROGRAMMING (PBPP)

WHEREAS, pursuant to §2.2-229 of the Code of Virginia, as amended by Chapter 828 of the 2018 Acts of Assembly, it is the responsibility of the Office of Intermodal Planning and Investment (OIPI) to develop measures and targets related to the performance of the Commonwealth's surface transportation network for the Commonwealth Transportation Board's (Board) approval, including any performance measurement required by Title 23 or 49 of the United States Code; and

WHEREAS, Public Law 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21) amended 23 USC 150, providing that, "performance management will transform the Federal-aid highway program and provide a means to the most efficient investment of Federal transportation funds by refocusing on national transportation goals, increasing the accountability and transparency of the Federal-aid highway program, and improving project decision-making through performance-based planning and programming." Pursuant to 23 USC 150, the Federal-aid highway program is to be focused on national transportation goals in the areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays; and

WHEREAS, MAP-21 also amended 23 USC 150 to direct the United States Secretary of Transportation, in consultation with State departments of transportation, metropolitan planning organizations, and other stakeholders, to promulgate a rulemaking that establishes performance measures and standards relating to the national transportation goals and for each state to set performance targets that reflect the performance measures established in said rule(s); and

WHEREAS, various federal regulations were promulgated to address and set forth the requirements for, among other things, measures and targets relating to asset condition, system performance, congestion, and air quality, including 23 CFR §§490.105, 490.307, 490.407, 490.507, 490.607, 490.707, and 490.807, which require State Departments of Transportation and Metropolitan Planning Organizations including the Fredericksburg Area Metropolitan Planning Organization (FAMPO) to set targets for twelve measures; and

WHEREAS, more specifically, 23 CFR §§490.307 and 490.407 require the state to set Asset Condition Performance Targets, which apply to the National Highway System (NHS), for the following six measures: percentage of pavement in good condition and percentage of pavement in poor condition on Interstate highways; percentage of pavement in good condition and percentage of pavement in poor condition on Non-Interstate NHS highways; and percentage of deck area of bridges in good condition and percentage of deck area of bridges in poor condition on the NHS; and

WHEREAS, 23 CFR §§490.105, 490.507, 490.607, 490.707, and 490.807 set forth measures and require the state to set targets for system performance, congestion, and air quality relating to the highways on the NHS or portions thereof (collectively, System Performance Measures or Targets), which include the following six measures: travel time reliability on Interstate highways and travel time reliability on Non-Interstate NHS highways; freight reliability on Interstate highways; annual hours of peak hour excessive delay per capita on NHS highways (certain areas in Northern Virginia only); percent of non-single occupancy vehicle travel (certain areas in Northern Virginia only); and on-road mobile source emissions reductions from the Congestion Mitigation and Air Quality (CMAQ) Improvement Program (certain areas in Northern Virginia only); and

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WHEREAS, in accordance with 23 CFR §§490.105 and 490.107, two- and four-year targets for the MAP-21 performance measures relating to asset condition and system performance were to be established by the State in May 2018 and must be reported to FHWA by October 1, 2018, with additional progress reports due by October 1 every two years thereafter; and

WHEREAS, the Office of Intermodal Planning and Investment (OIPI) working collaboratively with the Virginia Department of Transportation (VDOT) has for 2018-2021 established proposed Asset Condition Performance Targets and System Performance Targets set out in Tables A and B below, having complied with the target setting and reporting requirements set forth in 23 CFR §§490.105, 490.107, 490.307, 490.407, 490.507, 490.607, 490.707, and 490.807; and

WHEREAS, OIPI, in consultation with VDOT, recommends adoption of the proposed Asset Condition Performance Targets and System Performance Targets set forth in Tables A and B below, respectively:

Table A

Asset Condition Measures	Scope	2-Year Target[1] (2018-2019)	4-Year Target[2] (2018-2021)
Percentage of Pavement in Good Condition	Interstate	45%	45%
Percentage of Pavement in Poor Condition	Interstate	<3%	<3%
Percentage of Pavement in Good Condition	NHS (non-Interstate)	25%	25%
Percentage of Pavement in Poor Condition	NHS (non-Interstate)	<5%	<5%
Percentage of Pavement in Good Condition[3] (IRI only)	NHS (non-Interstate)	55%	55%
Percentage of Pavement in Poor Condition[3] (IRI only)	NHS (non-Interstate)	<10%	<10%
Percentage of Deck Area of Bridges in Good Condition	NHS	33.5%	33%
Percentage of Deck Area of Bridges in Poor Condition	NHS	3.5%	3%

Table B

System Performance Measures	Scope	2-Year Target[1] (2018-2019)	4-Year Target[2] (2018-2021)
Percentage of Person-Miles Traveled that are Reliable	Interstate	82.2%	82%
Percentage of Person-Miles Traveled that are Reliable	NHS (non-Interstate)	N/A	82.5%
Truck Travel Times Reliability Index	Interstate	1.53	1.56
Annual Hours of Peak Hour Excessive Delay Per Capita[4]	NHS	N/A	26.7 hrs/capita
Percentage of Non-SOV Travel[4]	NHS	36.9%	37.2%
Total Emission Reductions for Volatile Organic Compounds[5]	CMAQ Projects	1.721 kg/day	1.985 kg/day
Total Emission Reductions for Nitrogen Oxides (NOx)[5]	CMAQ Projects	3.744 kg/day	4.23 kg/day

1 All two-year targets cover the time period of Jan. 1, 2018 to Dec. 31, 2019, except for the CMAQ targets which follow the federal fiscal year (Oct. 1, 2017 to Sept. 30, 2019). 2 All four-year targets cover the time period of Jan. 1, 2018 to Dec. 31, 2021, except for CMAQ targets which follow the federal fiscal year (Oct. 1, 2017 to Sept. 30, 2021). 3 Per federal guidance, pavement condition is measured by two methods: 1) International Roughness Index (IRI); and 2) IRI, cracking, rutting or faulting. For 2018 to 2022, Non-Interstate NHS pavement condition is to be measured by IRI only. Beginning in 2022, Non-Interstate NHS pavement condition will be measured by all four distresses. Two sets of targets for Non-Interstate NHS pavement condition are provided to illustrate the relative difference in the two measurements and resulting targets. 4 Targets apply only to certain urbanized areas designated as nonattainment or maintenance for specified pollutants under National Ambient Air Quality Standards (the Virginia portion of the Washington, DC-MD-VA 8-hour ozone nonattainment area). 5 Targets apply to

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CMAQ projects in areas designated as nonattainment or maintenance for certain National Ambient Air Quality Standards (the Virginia portion of the Washington, DC-MD-VA 8-hour ozone nonattainment area).

WHEREAS, the Fredericksburg Area Metropolitan Planning Organization (FAMPO) approved, for each of the performance measures set by the Commonwealth of Virginia through referenced therein, the Asset Condition Performance Targets and System Performance Targets set forth in Tables A and B for 2018-2021 on October 15, 2018.

WHEREAS, the Map-21/FAST Act federal regulations require that MPOs make their Constrained Long Range Transportation Plan (CLRP) and TIP fully compliant with the new performance based planning and programming regulations for Asset Management and System Performance by May 20, 2019 in order to amend these plans after May 20, 2019; and

WHEREAS, FAMPO will need to amend its CLRP and TIP during the summer of 2019 to add new Smart Scale Round 3 and other projects from the FY 20-25 SYIP which will trigger the necessity of satisfying the referenced performance based planning and programming regulations.

NOW THEREFORE BE IT RESOLVED that the Fredericksburg Area Metropolitan Planning Organization (FAMPO) hereby approves updating the 2045 Constrained Long Range Plan and FY 18-21 Transportation Improvement Program to be fully compliant with the new Map-21/FAST Act performance measures for the Asset Condition Performance Targets and System Performance Targets.

Adopted by the Policy Committee at its meeting on May 20, 2019.

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Timothy McLaughlin, Chair
Fredericksburg Area Metropolitan Planning Organization
Policy Committee

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Fredericksburg Area Metropolitan Planning Organization (FAMPO)

2045 Constrained Long-Range Plan (CLRP) System Performance Report

May 2019

1. Introduction and Background

The Moving Ahead for Progress in the 21st Century Act (MAP-21) Act of 2012 and the Fixing America's Surface Transportation Act (FAST Act) of 2015 established a Transportation Performance Management framework under which state departments of transportation (DOT), metropolitan planning organizations (MPO), and providers of public transportation must carry out their federally required transportation planning and programming activities. The framework requires a coordinated, performance-based approach to transportation decision-making to support national goals for the federal-aid highway and public transportation programs.

In the legislation, Congress defined national goals for the transportation system and directed the U.S. Department of Transportation (U.S. DOT) to establish performance measures to track progress toward reaching these goals. U.S. DOT promulgated a series of performance measure rules throughout 2014-2018. States, MPOs, and providers of public transportation must set performance targets for each measure to be achieved within a specified time period, and then monitor performance and periodically report to U.S. DOT on progress toward the targets.

On May 27, 2016, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) issued the Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning Final Rule, referred to as the Planning Rule.[1] This rule details how state DOTs and MPOs must implement the new transportation performance management provisions in long-range transportation plans, transportation improvement programs, and the general statewide and metropolitan planning process.

System Performance Report

In accordance with the Planning Rule, FAMPO must include as an element of its Long-Range Transportation Plan (LRTP) a description of the performance measures and targets that apply to the FAMPO planning area within a System Performance Report. The System Performance Report evaluates the condition and performance of the transportation system with respect to required performance targets, and reports on progress achieved in meeting the targets in comparison with baseline data and previous reports.[2] The Planning Rule specifies the following timeframes for when FAMPO must include the System Performance Report and address performance measures and targets in the LRTP:

- In any LRTP adopted on or after May 27, 2018, the System Performance Report must reflect Highway Safety (PM1) measures.

- In any LRTP adopted on or after October 1, 2018, the System Performance Report must reflect Transit Asset Management measures.

- In any LRTP adopted on or after May 20, 2019, the System Performance Report must reflect Pavement and Bridge Condition (PM2) measures.

- In any LRTP adopted on or after May 20, 2019, the System Performance Report must reflect System Performance (PM3) measures.

- In any LRTP adopted on or after July 20, 2022, the System Performance Report must reflect Transit Safety measures.

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[1] The Final Rule modified the Code of Federal Regulations at 23 CFR Part 450 and 49 CFR Part 613.
[2] If FAMPO were to use scenario planning during development of the LRTP, the System Performance Report must also include an analysis of how the preferred scenario has improved the performance of the transportation system and how changes in local policies and investments have impacted the costs necessary to achieve the identified targets.

Reflecting these timelines, this FAMPO 2045 LRTP Update System Performance Report includes the Highway Safety (PM1), Transit Asset Management, Bridge and Pavement (PM2), and System Performance (PM3) performance measures, targets and baseline performance. The following sections provide a description of these performance measures and the associated performance targets established by FAMPO in coordination with state and local partners during 2017 and 2018.

Establishing Performance Targets

The Planning Rule requires that states and transit providers establish initial performance targets within a specified amount of time of the effective date of each final performance measure rule.

- For the PM1 performance measures, Virginia Department of Transportation (VDOT) was required to establish initial statewide safety targets by August 31, 2017 and will establish targets annually by August 31.

- For the PM2 and PM3 measures, VDOT was to establish initial statewide targets by May 20, 2018.

- For the Transit Asset measures, Virginia Railway Express (VRE) (Tier 1 operator) and Fredericksburg Regional Transit (FRED) (Tier 2 operator) were required to establish targets by January 1, 2017.

- The deadline for the Transit Safety rule is July 20, 2020.

- Note that the Department of Rail and Public Transportation (DRPT) developed a Group Plan for the full set of eligible Tier 2 public transportation providers in Virginia, including FRED. In this case, DRPT, rather than each individual provider, establishes the transit targets.)

Once VDOT, DRPT, and VRE establish performance targets for a measure, FAMPO must then establish targets within 180 days. FAMPO has the flexibility to establish targets by either:

- Agreeing to plan and program projects in FAMPO's TIP that contribute toward the accomplishment of the VDOT, DRPT, or VRE targets. FAMPO's numeric target is identical to the VDOT, DRPT, or VRE numeric target, and FAMPO will plan and program projects that contribute to this number. Or,

- Committing to a quantifiable target for a performance measure for the FAMPO planning area. The numeric target for FAMPO is different than the VDOT, DRPT, or VRE numeric target. FAMPO will plan and program projects that contribute to the MPO's numeric target.

These requirement details and responsibilities are also specified in FAMPOs "3C" Planning Agreement between FAMPO, the Commonwealth of Virginia, and the Potomac and Rappahannock Transportation Commission, the Virginia Rail Express, and Fredericksburg Regional Transit (FRED).

Condition and Performance

The System Performance Report discusses the condition and performance of the transportation system for each applicable target as well as the progress achieved by FAMPO in meeting targets in comparison with system performance recorded in previous reports. Given that the federal performance measures requirements are new, there are no previous system performance reports to reference performance outcomes relative to previous targets. Accordingly, this first System Performance Report focuses on baseline performance. Starting in fall of 2017, FAMPO initiated a careful and collaborative process to review performance and establish targets as detailed below (and provided as attachments in Appendix A):

- PM1 performance trends and targets were reviewed during fall 2017 and fall 2018, with CY 2018 targets adopted by FAMPO on December 17, 2017 and CY 2019 targets adopted by FAMPO on December 10, 2018.

- Transit Asset condition trends and targets were reviewed during fall 2017 with VRE and FRED targets adopted by FAMPO on December 17, 2017.

- PM2 and PM3 performance trends and targets were review during summer and fall 2018, with applicable 2-year and 4-year targets adopted by FAMPO on October 15, 2018.

VDOT, DRPT, and VRE will continue to monitor and report performance on an annual or biennial basis, depending on the measure. Future FAMPO System Performance Reports will discuss progress made toward meeting each of the targets since this initial baseline report.

2. Highway Safety Measures (PM1)

Safety Performance Measures

Effective April 14, 2016, the FHWA established five highway safety performance measures to carry out the Highway Safety Improvement Program (HSIP). The HSIP is a federal-aid funding program intended to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. The safety performance measures are:

1. Number of fatalities;

2. Rate of fatalities per 100 million vehicle miles traveled (VMT);

3. Number of serious injuries;

4. Rate of serious injuries per 100 million vehicle miles traveled (VMT); and

5. Number of non-motorized fatalities and non-motorized serious injuries.

Safety Targets

FHWA requires states and MPOs to establish PM1 targets annually. Each year by August 31, VDOT will establish and report PM1 targets for the following calendar year in the HSIP Annual Report that is submitted to FHWA. FAMPO must then establish PM1 targets for the same calendar year by February 27 (within 180 days of the VDOT submission).

VDOT established and reported Virginia's first set of PM1 targets, for calendar year 2018, in the HSIP Annual Report submitted to FHWA on August 31, 2017. FAMPO adopted Virginia's PM1 targets on December 18, 2017 (FAMPO Resolution 18-11).

VDOT established and reported Virginia's calendar year 2019 PM1 targets in the HSIP Annual Report submitted to FHWA on August 31, 2018. FAMPO adopted Virginia's PM1 targets on December 10, 2018 (by consent agenda as presented in the letter adopting state targets for safety).
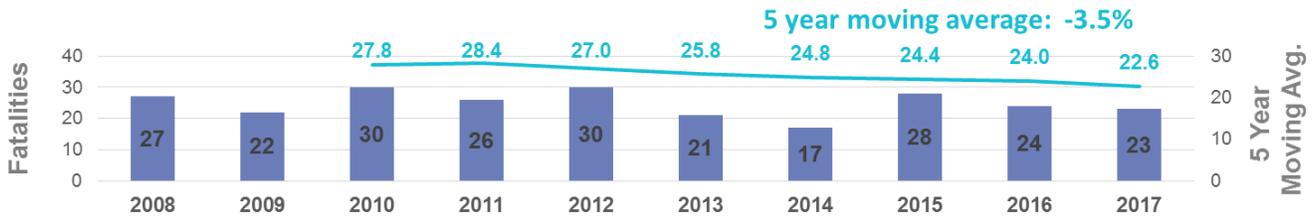
Table 2.1 presents 2017 safety performance statewide and in the FAMPO planning area, and VDOT's safety targets for 2018. Table 2.2 includes 2018 safety performance and 2019 targets.
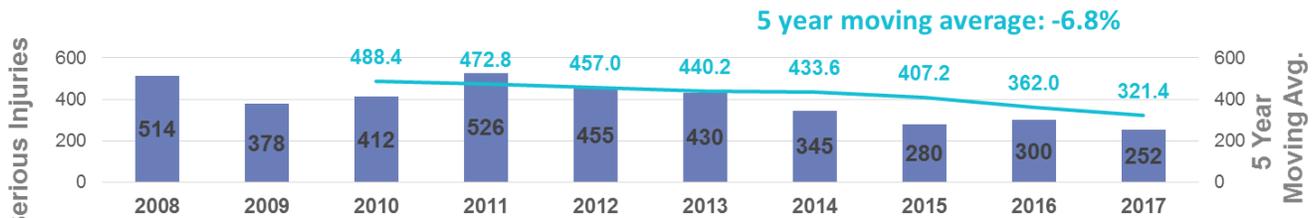
FAMPO Rationale – Safety Targets

FAMPO reviewed detailed safety performance data and trends made available by VDOT for the region. The review indicated that across all measures that regional performance is continuing to support statewide targets. In addition, programmed projects and programs within the region are anticipated to generate safety outcomes that would continue to help the region support and exceed safety targets. Figure 2.1 presents a summary of these FAMPO trends relative to statewide percent reduction targets for CY 2019 (presented in Table 2.2 as the actual measures for the Virginia performance targets).

Figure 2.1 FAMPO Safety Performance Trends (Fatal and Serious Injuries and Rates)

Regional Safety Trends – Fatal and Serious Injuries (people)

5 year moving average: -3.5%

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fatalities	27	22	30	26	30	21	17	28	24	23
5 Year Moving Avg.			27.8	28.4	27.0	25.8	24.8	24.4	24.0	22.6

VDOT Target 2% annual reduction for fatalities

< **FAMPO Trend** 5% annual reduction for fatalities (2013-17)

5 year moving average: -6.8%

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Serious Injuries	514	378	412	526	455	430	345	280	300	252
5 Year Moving Avg.			488.4	472.8	457.0	440.2	433.6	407.2	362.0	321.4

VDOT Target 5% annual reduction for serious injuries

< **FAMPO Trend** 7% annual reduction for serious injuries (2013-17)

Regional Safety Trends – Fatal and Serious Injury Rate (people)

5 year moving average: -4.4%

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fatality Rate	0.87	0.70	0.96	0.84	0.95	0.66	0.53	0.83	0.72	0.70
5 Year Moving Avg.			0.89	0.91	0.87	0.82	0.79	0.76	0.74	0.69

VDOT Target 3% annual reduction for fatality rate

< **FAMPO Trend** 6% annual reduction for fatality rate (2013-17)

5 year moving average: -7.7%

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Serious Injury Rate	16.64	12.08	13.19	17.03	14.42	13.60	10.82	8.31	9.02	7.4
5 Year Moving Avg.			15.68	15.21	14.67	14.06	13.81	12.84	11.23	9.83

VDOT Target 7% annual reduction for serious injury rate

< **FAMPO Trend** 12% annual reduction for serious injury rate (2013-17)

Figure 2.1 shows that the trend for these four measures continues to decrease , with the FAMPO annual reduction typically exceeding the statewide target reduction. The same trend is observed for non-motorized crashes (figure not presented within this report).

Table 2.1. Highway Safety (PM1) Baseline Performance and Targets – 2017

Performance Measures	Virginia 2017 Performance (5-Year Rolling Avg. 2012-2016)	FAMPO 2017 Performance (5-Year Rolling Avg. 2012-2016)	Virginia 2018 Performance Targets
Number of Fatalities	746.0	24.0	709.0
Rate of Fatalities per 100 Million Vehicle Miles Traveled (VMT)	0.944	0.740	0.830
Number of Serious Injuries	8,488.0	362.0	7,570.0
Rate of Serious Injuries per 100 Million Vehicle Miles Traveled	10.774	11.230	8.720
Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries (VMT)	764.6	22.4	681.0

Table 2.2. Highway Safety (PM1) Baseline Performance and Targets – 2018

Performance Measures	Virginia 2018 Performance (5-Year Rolling Avg. 2013-2017)	FAMPO 2018 Performance (5-Year Rolling Avg. 2013-2017)	Virginia 2019 Performance Targets
Number of Fatalities	759.6	22.6	840.0
Rate of Fatalities per 100 Million Vehicle Miles Traveled (VMT)	0.940	0.690	0.940
Number of Serious Injuries	7,992.0	321.4	7,689.0
Rate of Serious Injuries per 100 Million Vehicle Miles Traveled	9.924	9.830	8.750
Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries (VMT)	738.4	21.0	714.0

VDOT will update safety performance annually consistent with a 5-year rolling performance average for the state and the FAMPO planning area. FAMPO will reflect this information within each subsequent System Performance Report to track performance over time in relation to baseline conditions and established targets.

3. Pavement and Bridge Condition Measures (PM2)

PM2 Performance Measures Overview

In January 2017, USDOT published the Pavement and Bridge Condition Performance Measures Final Rule. This rule, which is also referred to as the PM2 rule, establishes six performance measures for pavement and bridge condition on Interstate and non-Interstate National Highway System (NHS) roads. The PM2 measures are:

1. Percent of Interstate pavements in good condition;
2. Percent of Interstate pavements in poor condition;
3. Percent of non-Interstate National Highway System (NHS) pavements in good condition;
4. Percent of non-Interstate NHS pavements in poor condition;
5. Percent of NHS bridges (by deck area) classified as in good condition; and
6. Percent of NHS bridges (by deck area) classified as in poor condition.

Pavement Condition

The four pavement condition measures represent the percentage of lane-miles on the Interstate and non-Interstate NHS that are in good condition or poor condition. Five pavement condition metrics are used to assess condition:

- International Roughness Index (IRI) – an indicator of roughness; applicable to all asphalt and concrete pavements.
- Cracking percent – percentage of the pavement surface exhibiting cracking; applicable to all asphalt and concrete pavements.
- Rutting – extent of surface depressions; applicable to asphalt pavements.
- Faulting – vertical misalignment of pavement joints; applicable to certain types of concrete pavements.
- Present Serviceability Rating (PSR) – a quality rating applicable to lower speed roads.

For each pavement metric, a threshold is used to establish good, fair, or poor condition. Table 3.1 lists the thresholds.

Note, per Federal guidance, pavement condition is measures by two methods: 1) IRI, and 2) IRI, cracking, rutting or faulting. For 2018 to 2022, non-Interstate NHS pavement condition can be measured by either approach (IRI only, or all four distresses). Beginning in 2022, non-Interstate NHS pavement condition will be measured by all four distresses. VDOT voluntarily set targets for both approaches, while officially submitting to FHWA the IRI only approach.

Table 3.1. Pavement Condition Performance Thresholds

Metric Rating	Good	Fair	Poor
IRI (inches/mile)	< 95	95 – 170	> 170
PSR (0.0-5.0 value)	>=4.0	2.0 – 4.0	<=2.0
Cracking Percent (%)	< 5	CRCP: 5 – 10 Jointed: 5 – 15 Asphalt: 5 – 20	CRCP: > 10 Jointed: > 15 Asphalt: > 20
Rutting (inches) (for asphalt only)	< 0.20	0.20 – 0.40	> 0.40
Faulting (inches) (for jointed concrete only)	< 0.10	0.10 – 0.15	> 0.15

Pavement condition is assessed for each 0.1 mile section of the through travel lanes of mainline highways on the Interstate or the non-Interstate NHS using these metrics and thresholds. A pavement section is rated as good if all three metric ratings are good, and poor if two or more metric ratings are poor. Sections that are not good or poor are considered fair.

The good/poor measures are expressed as a percentage and are determined by summing the total lane-miles of good or poor highway segments and dividing by the total lane-miles of all highway segments on the applicable system. Pavement in good condition suggests that no major investment is needed and should be considered for preservation treatment. Pavement in poor condition suggests major reconstruction investment is needed due to either ride quality or a structural deficiency.

Bridge Condition

The two bridge condition performance measures refer to the percentage of bridges by deck area on the NHS that are in good condition or poor condition. The measures assess the condition of four bridge components: deck, superstructure, substructure, and culverts. Bridge owners are required to inspect bridges on a regular basis and report data to FHWA, which form the basis for determining condition levels.

Each component has a metric rating threshold to establish good, fair, or poor condition, as shown in Table 3.2. Each bridge on the NHS is evaluated using these ratings. If the lowest rating of the four metrics is greater than or equal to seven, the structure is classified as good. If the lowest rating is less than or equal to four, the structure is classified as poor. If the lowest rating is five or six, it is classified as fair.

Table 3.2. Bridge Condition Performance Rating Thresholds

Metric Rating	Good	Fair	Poor
Deck (Item 58)	≥ 7	5 or 6	≤ 4
Superstructure (Item 59)	≥ 7	5 or 6	≤ 4
Substructure (Item 60)	≥ 7	5 or 6	≤ 4
Culvert (Item 62)	≥ 7	5 or 6	≤ 4

The bridge measures are expressed as the percent of NHS bridges in good or poor condition. The percent is determined by summing the total deck area of good or poor NHS bridges and dividing by the total deck area of the bridges carrying the NHS. Deck area is computed using structure length and either deck width or approach roadway width.

Bridges in good condition suggests that no major investment is needed. Bridges in poor condition are safe to drive on; however, they are nearing a point where substantial reconstruction or replacement is needed.

PM2 Performance Targets

Performance for the PM2 measures is assessed over a series of four-year performance periods. The first performance period began on January 1, 2018 and runs through December 31, 2021. States must report baseline performance and targets at the beginning of each period and update performance at the midpoint and end of each performance period.

The PM2 rule requires state DOTs and MPOs to establish performance targets for all six measures and monitor progress towards achieving the targets. States must establish:

- Four-year statewide targets for the percent of Interstate pavements in good and poor condition;
- Two-year and four-year statewide targets for the percent of non-Interstate NHS pavements in good and poor condition; and
- Two-year and four-year targets for the percent of NHS bridges (by deck area) in good and poor condition.

MPOs must establish four-year targets for all six measures by either agreeing to program projects that will support the statewide targets, or setting quantifiable targets for the MPO's planning area.

The two-year and four-year targets represent pavement and bridge condition at the end of calendar years 2019 and 2021, respectively.

PM2 Baseline Performance and Established Targets

VDOT established statewide PM2 targets on May 18, 2018. FAMPO was then required to establish PM2 targets no later than November 14, 2018. FAMPO agreed to support VDOT's PM2 performance targets on October 15, 2018. By adopting VDOT's targets, FAMPO agrees to plan and program projects that help VDOT achieve these targets.

FAMPO Rationale - Pavement Targets

FAMPO staff reviewed Interstate and non-Interstate pavement performance trends within the region (197 lane miles of Interstate and 368 lane miles of non-Interstate NHS), reviewed programmed state of good repair and capacity investments, and looked at other considerations such as truck volumes and ongoing or planned construction in order to evaluate future performance. Overall, across all four measures, the region is above average relative to statewide performance and is expected to remain that way as a result of programmed investments. As a result, FAMPO elected to adopt the statewide targets.

FAMPO Rationale - Bridge Targets

FAMPO staff reviewed bridge condition performance trends within the region (78 NBI bridges and culverts on the NHS totaling 910,000 sf of deck area), reviewed programmed state of good repair and capacity investments, and looked at other considerations such as truck volumes and ongoing or planned construction in order to evaluate future performance. There are eight total structures within the region that are rated as poor, most of which are programmed for rehabilitation or replacement over the next four years. In addition, a number of fair bridges on I-95 will be improved over the next four years as a result of planned investments. While regional performance currently trails statewide performance, programmed projects should bring regional performance in line with statewide performance over the next four years. As a result, FAMPO elected to adopt the statewide targets.

Table 3.3 presents baseline performance for each PM2 measure for Virginia and for the FAMPO planning area as well as the two-year and four-year statewide targets established by VDOT.

Table 3.3. Pavement and Bridge Condition (PM2) Performance and Targets

Performance Measures	Virginia Performance (Baseline)	FAMPO Performance (Baseline)	Virginia 2-year Target(2019)	Virginia 4-year Target(2021)
Percent of Interstate pavements in good condition	57.8%	60.0%	N/A	45.0%
Percent of Interstate pavements in poor condition	0.4%	0.0%	N/A	3.0%
Percent of non-Interstate NHS pavements in good condition (IRI only)	54.0%	34.3%	55.0%	55.0%
Percent of non-Interstate NHS pavements in poor condition (IRI only)	9.2%	0.8%	10.0%	10.0%
Percent of NHS bridges (by deck area) in good condition	34.5%	7.3%	33.5%	33.0%
Percent of NHS bridges (by deck area) in poor condition	3.5%	7.2%	3.5%	3.0%

In setting the statewide PM2 pavement condition targets, VDOT analyzed current performance, trends in performance data from recent years, and predicted performance over the next few years. This information informed the development of Virginia's targets for pavement condition, both good and poor on Interstate and Non-Interstate NHS routes. Pavement performance models assume yearly average pavement deterioration and current levels of pavement funding available in future years. A number of factors may affect future performance, including any significant cost increases for materials, larger load levels from allowing heavier trucks on roads, and extreme weather conditions, particularly more severe than normal freeze-thaw cycles. Impacts from these factors are hard to quantify and cannot be predicted by the models.

In setting the statewide bridge condition targets, VDOT used information provided by its Bridge Management Database, historical bridge performance, and expected deterioration rates. This information was compared to existing programmed bridge work and anticipated maintenance and construction funding over the next four years. Based on this information, the established 2- and 4-year targets are consistent with a minor decrease in the share of NHS bridge deck area classified in good condition through 2019 and 2021, and are consistent with continuing improvement (a decrease) in the share of NHS bridge deck area classified in poor condition through 2019 and 2021.

On or before October 1, 2020, VDOT will provide FHWA and FAMPO a detailed report of pavement and bridge condition performance covering the period of January 1, 2018 to December 31, 2019. VDOT and FAMPO will also have the opportunity at that time to revisit the four-year PM2 targets.

4. System Performance, Freight, and Congestion Mitigation & Air Quality Improvement Program Measures (PM3)

PM3 Performance Measures Overview

In January 2017, USDOT published the System Performance/Freight/CMAQ Performance Measures Final Rule to establish measures to assess passenger and freight performance on the Interstate and non-Interstate National Highway System (NHS), and traffic congestion and on-road mobile source emission reductions in areas that do not meet federal National Ambient Air Quality Standards (NAAQS). The rule, which is referred to as the PM3 rule, established the following six performance measures:

National Highway Performance Program (NHPP)

1. Percent of person-miles on the Interstate system that are reliable, also referred to as Level of Travel Time Reliability (LOTTR);
2. Percent of person-miles on the non-Interstate NHS that are reliable (LOTTR);

National Highway Freight Program (NHFP)

3. Truck Travel Time Reliability Index (TTTR);

Congestion Mitigation and Air Quality Improvement Program (CMAQ)

4. Annual hours of peak hour excessive delay per capita (PHED);
5. Percent of non-single occupant vehicle travel (Non-SOV); and
6. Cumulative 2-year and 4-year reduction of on-road mobile source emissions for CMAQ funded projects.

FAMPO is only required to set targets for the first performance period (2018 – 2021) for the first three measures listed above. For the CMAQ PHED per capita and non-SOV travel measures, as described in 23 CFR490.105(f)(5)(i):

- if an MPO is not required to establish targets for the traffic congestion measures for an urbanized area, but NHS highways cross any part of an urbanized area with a population greater than 1 million within a metropolitan planning area (MPA) and

- that urbanized area contains a nonattainment or maintenance area (for any one of the criteria pollutant) outside of its MPA, then

- that MPO is encouraged to coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the traffic congestion measures for that urbanized area.

FAMPO coordinated with the National Capital Region Transportation Planning Board in the target selection process for the traffic congestion measures for an urbanized area, as those targets cover the full extent of the urbanized area boundary.

LOTTR Measures

LOTTR is defined as the ratio of longer travel times (80th percentile) to a normal travel time (50th percentile) over all applicable roads during four time periods (AM peak, Mid-day, PM peak, and weekends) that cover the hours of

6 a.m. to 8 p.m. each day. The LOTTR ratio is calculated for each roadway segment, essentially comparing the segment with itself. A segment is reliable if its LOTTR is less than 1.5 during all four time periods. If one or more time periods has a LOTTR of 1.5 or above, that segment is unreliable.

The two LOTTR measures are expressed as the percent of person-miles traveled on the Interstate or non-Interstate NHS system that are reliable. Person-miles take into account the number of people traveling in buses, cars, and trucks over these roadway segments. To obtain person miles traveled, the vehicle miles traveled (VMT) for each segment is multiplied by the average vehicle occupancy for each type of vehicle on the roadway. To calculate the percent of person miles traveled that are reliable, the sum of the number of reliable person miles traveled is divide by the sum of total person miles traveled.

TTTR Measure

The TTTR performance measure assesses reliability for trucks traveling on the Interstate. A TTTR ratio is generated by dividing the 95th percentile truck travel time by a normal travel time (50th percentile) for each segment of the Interstate system over five time periods throughout weekdays and weekends (AM peak, Mid-day, PM peak, weekend, and overnight) that cover all hours of the day.

For each segment, the highest TTTR value among the five time periods is multiplied by the length of the segment. The sum of all length-weighted segments is then divided by the total length of Interstate to generate the TTTR Index.

The data used to calculate these PM3 measures is provided by FHWA via the National Performance Management Research Data Set (NPMRDS). This dataset contains travel times, segment lengths, and Annual Average Daily Travel (AADT) for Interstate and non-Interstate NHS roads.

PM3 Performance Targets

As with the PM2 measures, performance for the PM3 measures is assessed over a series of four-year performance periods. The first performance period began on January 1, 2018 and runs through December 31, 2021. States must report baseline performance and targets at the beginning of each period and update performance at the midpoint and end of each performance period.

The PM3 rule requires state DOTs and MPOs to establish performance targets for these measures and monitor progress towards achieving the targets. VDOT must establish two-year and four-year statewide targets for the Interstate LOTTR and the TTTR measures, and a four year target for the non-Interstate NHS LOTTR measure.

FAMPO must establish four-year performance targets for both LOTTR measures and the TTTR measure within 180 days of VDOT establishing statewide targets. MPOs establish targets by either agreeing to program projects that will support the statewide targets, or setting quantifiable targets for the MPO's planning area.

The two-year and four-year targets represent system performance at the end of calendar years 2019 and 2021, respectively.

PM3 Baseline Performance and Established Targets

VDOT established statewide PM3 targets on May 18, 2018. FAMPO was then required to establish PM3 targets no later than November 14, 2018. FAMPO agreed to support VDOT's PM3 performance targets on October 15, 2018. By adopting VDOT's targets, FAMPO agrees to plan and program projects that help VDOT achieve these targets.

FAMPO Rationale – LOTTR and TTTR Targets

Based on information provided by VDOT, the Fredericksburg MPO area Interstate LOTTR and TTTR performance significantly lags statewide performance as highlighted below. LOTTR on the non-Interstate NHS generally follows statewide performance.

- Interstate LOTTR – 49.9% and 53.1% of passenger miles traveled are reliable in 2016 and 2017 compared to 83.2% and 82.3% for statewide averages

- TTTR – 2.60 and 2.61 truck travel time reliability ratio in 2016 and 2017 compared to a 1.49 average ratio for statewide

This is expected given the measure definition of reliable travel and the performance of I-95 within the FAMPO region. FAMPO reviewed the performance trend for the entire I-95 corridor and on individual segments, and reviewed programmed projects within the corridor that may impact future reliability. The conclusion from this assessment was that the next 4-years of investments within the I-95 corridor will create an opportunity for significant performance improvements post-2021, however in the short-term, performance may continue to degrade as a result of work zones throughout the corridor (as the majority of the projects, including the Rappahannock River Crossing SB and NB projects and the I-95 Express Lane extension will not be complete by 2021).

Table 4.1 presents baseline performance for each PM3 measure for Virginia and for the FAMPO planning area as well as the two-year and four-year statewide targets established by VDOT.

Table 4.1. System Performance and Freight (PM3) - Performance and Targets

Performance Measures	Virginia Performance (Baseline)	FAMPO Performance Baseline (2017)	Virginia 2-year target (2019)	Virginia 4-year Target (2021)
Percent of person-miles on the Interstate system that are reliable (Interstate LOTTR)	82.6%	53.1%	82.2%	82.0%
Percent of person-miles on the non-Interstate NHS that are reliable (Non-Interstate NHS LOTTR)	86.8%	87.0%	N/A	82.5%
Truck travel time reliability index (TTTR)	1.49	2.61	1.53	1.56

In setting the statewide PM3 LOTTR targets, VDOT considered limitations with the NPMRDS data set and challenges in developing a data-driven target setting methodology.

With respect to the NPMRDS data set, the vendor that supplies 2017 data is different than the vendor that provided pre-2017 data. Different methodologies were used to calculate travel times, creating challenges in determining comparable year-over-year trends. Therefore, no extended data is available for comprehensive trend analysis. In addition, target setting for reliability is particularly challenging due to many external influencing factors such as VMT (which is a factor of the economy, gas prices, land use, and policy decisions), latent demand, incidents, work zones, and weather. These factors are difficult to predict and can move reliability in unexpected ways. Based on a few sample studies, VDOT has seen that the change in reliability is not consistent even for similar roadway improvements, which is most likely due to external factors.

VDOT assumes there will be linear growth of total person-miles traveled (PMT) in future years. VDOT estimated values of percentage of reliable PMT for 2018-2021 using four different methods. These considerations collectively informed the established two- and four-year LOTTR targets. The two- and four-year targets recognize a downward trend based on the limited baseline data while accounting for planned and programmed strategies aimed at minimizing reliability deterioration.

For the TTTR targets, VDOT considered the above-mentioned limitations with the NPMRDS data set. In addition, TTTR uses extreme case (95th percentile) travel time data. Typically, severe incidents or weather cause such travel times, both of which are hard to predict or manage. Furthermore, since the 95th and 50th percentile travel times will both change with projects and strategies, some non-intuitive or undesirable results may occur.

On or before October 1, 2020, VDOT will provide FHWA and FAMPO a detailed report of performance for the PM3 measures covering the period of January 1, 2018 to December 31, 2019. VDOT and FAMPO will also have the opportunity at that time to revisit the four-year PM3 targets.

5.   Transit Asset Management Measures

Transit Asset Performance Measures Overview

On July 26, 2016, FTA published the final Transit Asset Management rule. This rule applies to all recipients and subrecipients of Federal transit funding that own, operate, or manage public transportation capital assets. The rule defines the term "state of good repair," requires that public transportation providers develop and implement transit asset management (TAM) plans, and establishes state of good repair standards and performance measures for four asset categories: transit equipment, rolling stock, transit infrastructure, and facilities. Transit asset performance in each category is measured by asset class, which is the subgroup of capital assets within an asset category.

Table 5.1 below identifies the asset classes and associated transit asset performance measures.

Table 5.1. Transit Asset Performance Measures

Asset Category	Performance Measure
Equipment: Non-revenue support-service and maintenance vehicles	Percentage of non-revenue, support-service and maintenance vehicles that have met or exceeded their Useful Life Benchmark
Rolling Stock: Revenue vehicles by mode	Percentage of revenue vehicles within a particular asset class that have either met or exceeded their Useful Life Benchmark
Infrastructure: Only rail fixed-guideway, track, signals and systems	Percentage of track segments with performance restrictions
Facilities: Maintenance and administrative facilities; passenger stations (buildings) and parking facilities	Percentage of facilities within an asset class rated below condition 3 on the TERM scale

For equipment and rolling stock classes, Useful Life Benchmark (ULB) is defined as the expected lifecycle of a capital asset, or the acceptable period of use in service, for a particular transit provider's operating environment. ULB considers a provider's unique operating environment such as geography, service frequency, etc. and is not the same as an asset's useful life.

The Federal Transit Administration (FTA) established two tiers of public transportation providers based on size parameters. A Tier I agency operates rail, or has more than 100 vehicles in all fixed route modes, or has more than 100 vehicles or more in one non-fixed route mode. A Tier II provider is a subrecipient of FTA 5311 funds, or is an American Indian Tribe, or has 100 or less vehicles across all fixed route modes, or has 100 vehicles or less in one non-fixed route mode. Tier I providers must establish their own transit asset targets, as well as report performance and other data to FTA. Tier II providers have the option to establish their own targets or to participate in a group plan with other Tier II providers whereby targets are set by a plan sponsor for the entire group.

Transit Asset Performance Targets

Public transportation providers set and report TAM targets annually for the following fiscal year. They are required to provide their asset conditions and TAM targets to each MPO in which the transit provider's projects and services are programmed in the MPO's TIP. MPOs must then establish transit asset targets within 180 days of the date that the provider of public transportation established initial targets. Unlike with the PM1, PM2, and PM3 measures, MPOs are not required to establish new transit asset targets annually each time the public transportation provider establishes targets. Instead, subsequent MPO targets must be established when updating the TIP or LRTP.

MPOs can either agree to program projects that will support the transit provider's targets, or set their own separate regional targets for the MPO's planning area. Regional TAM targets may differ from agency TAM targets, especially if there are multiple transit agencies in the MPO's planning area, or in the event that one or more transit agencies have not provided TAM targets to the MPO.

Two providers of public transportation that meet the parameters noted above for this performance measure operate within the FAMPO planning area – Fredericksburg Regional Transit (FRED) and Virginia Railway Express (VRE).

VRE is the only Tier I provider that operates in the FAMPO Region. VRE established performance targets for each asset class under the four asset categories. Table 5.2 summarizes the current State of Good Repair (SGR) backlog for each asset class that was used by VRE to inform setting of performance targets for the upcoming fiscal year. The performance targets represent the goal for SGR backlog for each asset class. VRE reported the performance targets to FTA for 2018. Table 5.2 also presents the TAM targets used in assessing transit asset performance in the FAMPO planning area. FAMPO adopted/approved transit asset performance targets on December 18, 2017.

Table 5.2. VRE Transit Asset Targets

Asset Category Performance Measure	Asset Class	Num.	Factor	Performance	2018 Performance Target
Rolling Stock (Age): Percentage of revenue vehicles within a particular asset class that have met or exceeded their ULB	Commuter Rail Locomotive	20	20 year ULB	Average 7 years (Range: 6-8 years)	0% exceeded ULB
	Commuter Rail Cab Car	21	30 year ULB	Average 11 years (Range: 10-12 years)	0% exceeded ULB
	Commuter Rail Passenger Coach	79	30 year ULB	Average 7 years (Range: 1-11 years)	0% exceeded ULB
Equipment (Age): Percentage of non-revenue service vehicles that have met or exceeded their ULB	Non Revenue/ Service Automobile	5	8 year ULB	Average 2 years (Range: 1-3 years)	0% exceeded ULB
Infrastructure: Percentage of track segments with performance restrictions	Commuter Rail			N/A	
Facilities: Percentage of facilities with a condition rating below 3.0 on the FTA TERM Scale	Passenger Facilities	19	TERM	4 average	0% rated below 3
	Passenger Parking Facilities	4	TERM	3.7 average	0% rated below 3
	Maintenance Facilities	10	TERM	4 average	0% rated below 3
	Administrative Facilities	2	TERM	4 average	0% rated below 3

FRED is part of the Group Transit Asset Management Plan developed by DRPT for Tier II providers across Virginia. The 2018 and 2019 targets for the Tier II providers are available for review, as is the data and rationale supporting the targets, within DRPTs plan, available here. In total, based on data within the Group Plan, the performance targets presented in Table 5.3 apply to FRED's revenue vehicle fleet of 11 cutaway buses, 20 minibus's, and three primary facilities (administrative office, maintenance facility, and passenger facilities). For all measures, FRED exceeds the Group Plan performance targets for 2018 and 2019.

Table 5.3. FRED Transit Asset Targets

Asset Category Performance Measure	Asset Class	Num.	Factor	Performance	2018 Performance Target
Rolling Stock (Age): Percentage of revenue vehicles within a particular asset class that have met or exceeded their ULB	Cutaway Bus	11	14 year ULB	Average <2 years (0% exceed ULB)	10% exceeded ULB
	Minibus	20	14 year ULB	Average <6 years (0% exceed ULB)	25% exceeded ULB
Facilities: Percentage of facilities with a condition rating below 3.0 on the FTA TERM Scale	Passenger Facilities	1	TERM	4.6	10% rated below 3
	Maintenance Facilities	1	TERM	4.5	10% rated below 3
	Administrative Facilities	1	TERM	4.0	10% rated below 3

APPENDIX D: PERFORMANCE BASED PLANNING AND PROGRAMMING – PAVEMENT AND BRIDGE CONDITION (PM2) PERFORMANCE MEASURES FOR FAMPO FY2018-2021 TIP

PM2 Performance Measures Overview

USDOT published the Pavement and Bridge Condition Performance Measures Final Rule in January 2017, with an effective date of May 20, 2017. This rule, which is also referred to as the PM2 rule, establishes six performance measures for pavement and bridge condition on Interstate and non-Interstate National Highway System (NHS) roads. The PM2 measures are:

1. Percentage of Interstate pavements in good condition;
2. Percentage of Interstate pavements in poor condition;
3. Percentage of non-Interstate National Highway System (NHS) pavements in good condition;
4. Percentage of non-Interstate NHS pavements in poor condition;
5. Percentage of NHS bridges (by deck area) classified as in good condition; and
6. Percentage of NHS bridges (by deck area) classified as in poor condition.

The four pavement condition measures represent the percentage of lane-miles on the Interstate and non-Interstate NHS that are in good condition or poor condition. Pavement condition metrics are used to assess condition. For each pavement metric, a threshold is used to establish good, fair, or poor condition. Pavement in poor condition suggests major reconstruction investment is needed due to either ride quality or a structural deficiency.

The two bridge condition performance measures refer to the percentage of bridges by deck area on the NHS that are in good condition or poor condition. The measures assess the condition of four bridge components: deck, superstructure, substructure, and culverts. Each component has a metric rating threshold to establish good, fair, or poor condition. Each bridge on the NHS is evaluated using these ratings. Bridges in good condition suggests that no major investment is needed. Bridges in poor condition are safe to drive on; however, they are nearing a point where substantial reconstruction or replacement is needed.

Pavement and Bridge Condition Performance Targets

In accordance with the requirements of MAP-21 and the FAST Act, Virginia established pavement and bridge condition performance targets as reported in Virginia's Baseline Performance Period Report for 2018-2021[1]. This report, submitted to FHWA in October 2018, satisfies the federal requirement that State DOTs submit a Baseline Performance Period Report to FHWA by October 1st of the first year in a performance period. Performance measures for pavement condition are required for the National Highway System (NHS), while bridge condition requirements relate to structures identified as part of the

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[1] Virginia's Baseline Performance Period Report data is through December 2017.

National Bridge Inventory on the NHS. The pavement condition measures and established statewide performance targets for the 2018-2021 performance period are indicated in Table 1 below.

Table 1: Statewide Pavement Condition Measures and Performance Targets

Interstate Pavement Condition Measures[2]	Virginia CY 2018-2019 Two Year Target	Virginia CY 2018-2021 Four Year Target
Percentage of Pavements in Good Condition	N/A[3]	45.0%
Percentage of Pavements in Poor Condition	N/A3	3.0%
Non-Interstate NHS Pavement Condition Measures[4]	**Virginia CY 2018-2019 Two Year Target**	**Virginia CY 2018-2021 Four Year Target**
Percentage of Non-Interstate Pavements in Good Condition	25.0%	25.0%
Percentage of Non-Interstate Pavements in Poor Condition	5%	5.0%

Bridge condition measures and established performance targets for the 2018-2021 performance period are indicated in Table 2 below.

Table 2: Statewide NHS Bridge Condition Measures and Performance Targets

NHS Bridge Condition Measures	Virginia CY 2018-2019 Two Year Target	Virginia CY 2018-2021 Four Year Target
Percentage of Deck Area of NBI Bridges on the NHS in Good Condition	33.5%	33.0%
Percentage of Deck Area of NBI Bridges on the NHS in Poor Condition	3.5%	3.0%

Once Virginia established the statewide PM2 performance targets identified above, FAMPO was then required to establish four-year targets for all six measures no later than November 14, 2018. MPOs establish targets by either agreeing to program projects that will support the statewide targets, or setting quantifiable targets for the MPO's planning area. On October 15, 2018, FAMPO agreed to support

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[2] Interstate condition measures are based on four distresses: International Roughness Index (IRI), cracking, rutting, and faulting.

[3] During this first performance period, States are not required to establish 2-year targets for interstate pavements; however, Virginia has chosen to establish performance targets and are 45.0% and 3.0% for percentage of pavements in good and poor condition, respectively.

[4] During this first performance period, Federal requirements for Non-Interstate NHS pavement condition and performance targets are based on a single distress, IRI. However, Federal guidance outlined in a September 27, 2018 Memorandum on State DOT Targets for Non-Interstate NHS Pavement Measures allows for the use of full distress data when reporting Non-Interstate NHS performance targets. Given the availability of full distress data, Virginia has chosen this approach and reported performance targets for Non-Interstate NHS pavements based on all four distresses. This allows for consistency in assessing the condition and setting performance targets for both Interstate and Non-Interstate NHS pavements.

Virginia's statewide PM2 performance targets. By adopting Virginia's targets, FAMPO agrees to plan and program projects that help VDOT achieve these targets.

Background/History

Virginia's history of monitoring asset conditions and utilizing performance information to determine investment strategies based on available funding levels spans over 10 years for pavements and bridges.

VDOT maintains a comprehensive inventory of all pavement and bridges on the state-maintained network. This inventory, which includes location, maintenance responsibility, ownership, and current condition or inspection information, serves as the foundation for life cycle planning, performance forecasting, maintenance and rehabilitation needs estimation, as well as prioritization of work to maximize asset life given available funding. Condition information is also important for communicating with external stakeholders, including the general public.

VDOT's commitment to responsible Transportation Asset Management (TAM) practice is demonstrated through VDOT's annual condition data collection programs and its establishment and publication of network level pavement and bridge performance goals. VDOT's current condition measures and performance goals have been in place for many years and are fully integrated into VDOT's budgeting process and investment strategies.

Statewide, the federal pavement and bridge performance measures apply to a limited portion of the network for which VDOT is responsible (less than 15% of all lane miles and 18% of the bridge inventory).

Connection to Other Performance Based Planning Documents

VTrans, the state's long-range multimodal plan, provides the overarching vision and goals for transportation in the Commonwealth. The long-range plan provides a vision for Virginia's future transportation system and defines goals, objectives, and guiding principles to achieve the vision. It also provides direction to state and regional transportation agencies on strategies and policies to be incorporated into their plans and programs. The most recent approved long-range multimodal plan is VTrans2040.

Performance management, specifically as it relates to pavements and bridges, is included in the VTrans2040Vision, Goals & Objectives, and Guiding Principles as noted below:

- Guiding Principle 5: Ensure Transparency and Accountability, and Promote Performance Management - Work openly with partners and engage stakeholders in project development and implementation, and establish performance targets that consider the needs of all communities, measure progress towards targets, and to adjust programs and policies as necessary to achieve the established targets.

- Goal D: Proactive System Management - maintain the transportation system in good condition and leverage technology to optimize existing and new infrastructure.

- o Objectives:
  - ▪ Improve the condition of all bridges based on deck area.
  - ▪ Increase the lane miles of pavement in good or fair condition.

Virginia's federally required Transportation Asset Management Plan (TAMP) presents pavement and bridge inventory and conditions, along with the Commonwealth's performance objectives, measures, and associated risks as they relate to the federal requirements. Asset funding, investment strategies, forecasts, goals, and gaps are also included. The TAMP is specific to the NHS and provides the Commonwealth's Transportation Asset Management (TAM) processes and methodology to meet federal requirements. Pavement and bridge projects included in the STIP are consistent with Virginia's reported TAM processes and methodology.

The program of projects in the STIP are directly linked to the pavement and bridge objectives outlined in VTrans2040 and the TAMP through the strategies and actions that are priorities in Virginia.

Funding for Pavement and Bridge Projects

There are two key funding sources for pavement and bridge projects, the Highway Maintenance and Operations Fund (HMOF) and State of Good Repair (SGR) program funds. The pavement and bridge funding is used for differing projects from routine maintenance to reconstructive work. Funds are allocated to pavement and bridge projects based on an annual needs assessment process supported by a data-driven prioritization and selection process. The prioritization process is the same for the various funding sources; however, the State of Good Repair program funds are designated for deteriorated pavements and structurally deficient bridges.

The SGR program requires funds be distributed proportionality between VDOT and localities, based on assessed needs. More details, including the requirements for pavements and bridges, and the SGR prioritization process methodology, can be found at: State of Good Repair for Bridges and Local Assistance Funding Programs.

VDOT has developed a robust asset management program, placing maintenance of the transportation network at the forefront of VDOT's investment decisions. This commitment to responsible asset management practice is demonstrated through VDOT's annual collection of condition data on pavements and bridges along with its establishment and publication of network-level pavement and bridge performance targets. For more than a decade, VDOT has monitored pavement and bridge conditions using performance information (measures and targets) to determine investment strategies based on available funding levels.

In the annual needs assessment process, VDOT assesses 100% of the pavement network on Virginia's Interstate and Primary systems and approximately 20% of the Secondary system. In 2016, VDOT assessed 100% of the Secondary pavement network to create a condition baseline. The pavement condition data is compiled, analyzed and reviewed to report the optimized needs at a roadway system and district level. VDOT's pavement program selects resurfacing projects, in relation to needs, and optimizes the timing of projects through a data-driven pavement management system.

For bridges, VDOT follows national standards in performing safety inspections and determining general condition of the structures. Condition assessments are performed by certified safety inspection personnel. The inspection program requires a qualified inspector to complete a "hands-on" review of the structure or bridge during each inspection. By federal regulation, VDOT is required to conduct detailed inspections of NBI structures at intervals not to exceed 24 months. VDOT uses BrM software to store bridge condition and inventory data for each structure and to program, schedule, and track bridge and structure inspections. The data collected during inspections allows VDOT to use a proactive approach to maintenance. Preventive maintenance and timely intervention repairs are performed to avoid and slow deterioration that leads to greater rehabilitation or replacement cost. Virginia's bridge maintenance program is large and complex, so in order to direct its efforts more easily, performance targets have been developed.

VDOT uses a prioritization process when determining funding for the pavement and bridge programs and prioritizes work ranging from preventative maintenance to replacement. The prioritization processes take into account similar factors such as condition, cost effectiveness, maintenance history, and traffic volumes. While the systematic prioritization processes are a guide to assist in funding projects, districts direct the work performed as the local experts.

How do Pavement and Bridge Projects get selected for Inclusion in the STIP (and TIP)?

As noted above, the funding to meet Virginia's pavement and bridge objectives and targets is allocated to projects in the CTB-approved SYIP and is consistent with VTrans2040. Each spring, the public is invited to comment on projects included in the draft SYIP prior to CTB approval. Since the SYIP is the foundation for the STIP, the program of projects in the STIP demonstrates support to achieve Virginia's pavement and bridge performance objectives and targets and is consistent with Virginia's TAMP.

Pavement and Bridge Condition Investments in the FAMPO Region

FAMPO's TIP reflects investment priorities established in the FAMPO LRTP. The focus of FAMPO's investments in pavement and bridge condition include projects funded in the TIP that address preservation/maintenance on the Interstate and non-Interstate NHS in the FAMPO area. Categories include pavement replacement or reconstruction (on the NHS), new lanes or widenings of NHS facilities, including resurfacing existing NHS lanes associated with new capacity, bridge replacement or reconstruction, and new bridge capacity on the NHS.

The TIP devotes a significant amount of resources to projects that will address pavement and bridge condition performance. Major efforts include Route 17 reconstruction, Route 606 and 610 reconstruction, the I-95 Rappahannock River Crossing (southbound), Route 1 Rappahannock River bridge replacement, Route 3 Rappahannock River bridge replacement, and additional funding for preventative maintenance for bridges and system preservation. Due to the level of investment in pavement and bridge projects, FAMPO anticipates that once implemented, the TIP will contribute to progress toward achieving Virginia's statewide pavement and bridge condition performance targets.

APPENDIX E: PERFORMANCE BASED PLANNING AND PROGRAMMING – SYSTEM PERFORMANCE, FREIGHT, AND CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT PROGRAM (PM3) PERFORMANCE MEASURES FOR FAMPO FY2018-2021 TIP

PM3 Performance Measures Overview

USDOT published the System Performance/Freight/CMAQ Performance Measures Final Rule in January 2017, thereby establishing measures to assess passenger and freight performance on the Interstate and non-Interstate National Highway System (NHS), and traffic congestion and on-road mobile source emission reductions in areas that do not meet federal National Ambient Air Quality Standards (NAAQS). The rule, which is referred to as the PM3 rule, established the following six performance measures:

1. Percent of person-miles on the Interstate system that are reliable, also referred to as Level of Travel Time Reliability (LOTTR);

2. Percent of person-miles on the non-Interstate NHS that are reliable (LOTTR);

3. Truck Travel Time Reliability Index (TTTR);

4. Annual hours of peak hour excessive delay per capita (PHED);

5. Percent of non-single occupant vehicle travel (Non-SOV); and

6. Cumulative 2-year and 4-year reduction of on-road mobile source emissions for CMAQ funded projects.

FAMPO is currently required to set targets for the first performance period (2018 – 2021) for only the first three measures listed above. The PHED, Non-SOV, and on-road emission measures do not apply in the FAMPO region. FAMPO coordinated with the National Capital Region Transportation Planning Board in the target selection process for the PHED and Non-SOV traffic congestion measures, as those targets cover the full extent of the Washington, DC-VA-MD urbanized area boundary.

The two LOTTR measures are expressed as the percent of person-miles traveled on the Interstate or non-Interstate NHS system that are reliable. Person-miles take into account the number of people traveling in buses, cars, and trucks. LOTTR is defined as the ratio of longer travel times (80th percentile) to a normal travel time (50th percentile) over applicable road segments during four time periods (AM peak, Mid-day, PM peak, and weekends) that cover the hours of 6 a.m. to 8 p.m. each day. A travel segment is reliable if its LOTTR is less than 1.5 during all four time periods. If one or more time periods has a LOTTR of 1.5 or above, that segment is unreliable.

The TTTR measure assesses reliability for trucks traveling on the Interstate. A TTTR ratio is generated by dividing the 95th percentile truck travel time by a normal travel time (50th percentile) for each segment of the Interstate system over five time periods throughout weekdays and weekends (AM peak, Mid-day, PM peak, weekend, and overnight) that cover all hours of the day. For each Interstate segment, the highest

TTTR value among the five time periods is multiplied by the length of the segment. The sum of all length-weighted segments is then divided by the total length of Interstate to generate the TTTR Index.

PM3 Performance Targets

In accordance with the requirements of MAP-21 and the FAST Act, Virginia established performance targets for the LOTTR and TTTR performance measures. All three measures are included in Virginia's Baseline Performance Period Report for 2018-2021 which was submitted to FHWA in October 2018. This report satisfies the federal requirement that State DOTs submit a Baseline Performance Period Report to FHWA by October 1st of the first year in a performance period and establishes baseline performance as of December 31, 2017.

The statewide LOTTR performance measures and performance targets for the 2018-2021 performance period are indicated in Table 1 below.

Table 1: Virginia Statewide NHS Travel Time Reliability Performance Measures and Targets

NHS Travel Time Reliability Performance	Virginia CY 2018-2019 Two Year Target	Virginia CY 2018-2021 Four Year Target
Percent of Person Miles Traveled on the Interstate that are Reliable	82.2%	82.0%
Percent of Person Miles Traveled on the Non-Interstate NHS that are Reliable	N/A[5]	82.5%

The statewide truck travel time reliability performance measure and performance targets for the 2018-2021 performance period are indicated in Table 2 below.

Table 2: Virginia Statewide Freight Reliability Performance Measure and Targets

Truck Travel Time Reliability Performance	Virginia CY 2018-2019 Two Year Target	Virginia CY 2018-2021 Four Year Target
Truck Travel Time Reliability Index	1.53	1.56

The Commonwealth Transportation Board (CTB) approves the performance measures and targets developed for Virginia's surface transportation network. Such targets, including those for Highway System Performance, are linked to the goals and objectives in Virginia's long-range transportation plan, or VTrans.

Once Virginia established the statewide PM3 performance targets identified above, FAMPO was then required to establish four-year targets for all three measures within 180 days. MPOs establish targets by either agreeing to program projects that will support the statewide targets, or setting quantifiable targets for the MPO's planning area. On October 15, 2018, FAMPO agreed to support Virginia's statewide PM3

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[5] During this first performance period, States are not required to establish 2-year targets for the Non-Interstate NHS reliability measure.

performance targets. By adopting Virginia's targets, FAMPO agrees to plan and program projects that help VDOT achieve these targets.

Connection to Other Performance Based Planning Documents

VTrans, the state's long-range multimodal plan, provides the overarching vision and goals for transportation in the Commonwealth. The long-range plan provides a vision for Virginia's future transportation system and defines goals, objectives, and guiding principles to achieve the vision. It also provides direction to state and regional transportation agencies on strategies and policies to be incorporated into their plans and programs. The most recent approved long range multimodal plan is VTrans2040.

VTrans2040 identifies the most critical transportation needs in Virginia to ensure the overarching transportation goals in the long-range plan are achieved. The screening process was informed by a data-driven approach that considers highway system performance measures and targets in addition to other performance indicators.

Performance management, as it relates to the reliability of the NHS and freight, is included in the VTrans2040Vision, Goals & Objectives, and Guiding Principles as noted below:

- Guiding Principle 4: Consider Operational Improvements and Demand Management First – Maximize capacity of the transportation network through increased use of technology and operational improvements as well as managing demand for the system before investing in major capacity expansions.

- Goal A – Economic Competitiveness and Prosperity: invest in a transportation system that supports a robust, diverse, and competitive economy.

  - o Objectives:

    - ▪ Reduce the amount of travel that takes place in severe congestion.
    - ▪ Reduce the number and severity of freight bottlenecks.
    - ▪ Improve reliability on key corridors for all modes.

- Goal B – Accessible and Connected Places: increase the opportunities for people and businesses to efficiently access jobs, services, activity centers, and distribution hubs.

  - o Objectives:

    - ▪ Reduce average peak-period travel times in metropolitan areas.
    - ▪ Reduce average daily trip lengths in metropolitan areas.
    - ▪ Increase the accessibility to jobs via transit, walking and driving in metropolitan areas.

Additionally, the Virginia Freight Element (VFE), a component of VTrans2040, discusses freight system trends, needs, and issues. The VFE also includes freight policies, strategies, and performance measures that guide Virginia's freight-related investment decisions.

Projects included in the STIP are directly linked to the Highway System Performance objectives outlined in VTrans2040 and associated needs analysis, and the VFE through the strategies and actions that are priorities in Virginia.

Funding for PM3 Highway System Performance Projects

SMART SCALE, Virginia's data-driven prioritization process for funding transportation projects, considers the potential of a project to improve reliability. In order to be considered for SMART SCALE, a project must first meet a need identified in VTrans2040, thus strengthening the connection between the planning and programming processes. Congestion mitigation, safety, accessibility, economic development, environment, and land use are the factors used to score SMART SCALE projects. Freight considerations are included in the economic development factor.

The FAST Act established a National Highway Freight Program, including a freight-specific funding program to highlight the focus on freight transportation needs. Projects eligible for National Highway Freight Program (NHFP) funding must contribute to the efficient movement of freight on the National Highway Freight Network (NHFN) and be included in the VFE. VDOT uses NHFP funding to construct freight beneficial projects identified through the SMART SCALE process.

SMART SCALE screening and scoring results, along with public feedback and CTB guidance, are used to develop the SYIP.

Other projects selected for funding are subject to program specific prioritization processes approved by the CTB. All funding (federal, state, and other sources) for transportation projects are allocated to projects in the CTB approved SYIP.

How do PM3 Highway System Performance Projects Get Selected for Inclusion in the STIP?

As noted above, the funding for all transportation projects, including funding for projects to meet Virginia's NHS system performance and freight movement targets is allocated to projects in the CTB approved SYIP, and is consistent with VTrans2040 and the VFE. Since the SYIP is the foundation of the STIP, the program of projects in the STIP demonstrates support to achieve Virginia's NHS and Freight Reliability performance objectives and targets.

PM3 Investments in the FAMPO Region

FAMPO's TIP reflects investment priorities established in FAMPO LRTP. The LRTP project prioritization methodology is focused primarily on highway projects (widening, new alignments and operational improvements). It considers many factors, including congestion relief and smart growth/mobility. The prioritization methodology used for selecting and programming FAMPO's CMAQ and RSTP funds in the TIP considers transit/TDM, bicycle and pedestrian projects, ITS, intermodal connections, and intersection improvements.

FAMPO's TIP investments devote resources to projects that address reliability such as the Rappahannock River Crossing, interchange relocations and improvements, commuter parking lot expansion, shoulder running, expansion of Express Lanes, addition of turn lanes, widenings, signal optimizations,

GWRideConnect TDM assistance, new FRED transit routes, and signal upgrades. Some of the investments over the next four years, especially those within the I-95 corridor, will create an opportunity for improved reliability performance after 2021, given the presence of work zones throughout the corridor, while others will provide the opportunity in the nearer term.

Given the significant resources devoted in the TIP to programs that address reliability for people and freight, FAMPO anticipates that once implemented, the TIP will contribute to progress towards achieving Virginia's statewide reliability performance targets.