System Performance Report

Federal law requires states and Metropolitan Planning Organizations (MPOs) to establish and approve performance measures and targets related to transportation safety, highway operations, and transit systems. This report provides information on the performance measures and targets, including how our long-range transportation plan, *Moving Dutchess Forward*, contributes to meeting established targets.

Background

Chapter 23 part 150(b) of the United States Code [23USC §150(b)] includes seven national performance goals for the Federal-Aid Highway Program:

- **Safety** – To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Capital Assets Condition** – To maintain the highway infrastructure and transit capital asset systems in a state of good repair.
- **Congestion Reduction** – To achieve a significant reduction in congestion on the National Highway System.
- **System Reliability** – To improve the efficiency of the surface transportation system.
- **Freight Movement & 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.

For public transportation, the law states that performance management shall be used to advance the general policy and purposes of the public transportation program as included in 49 USC §5301(a) and (b).

The Dutchess County Transportation Council (DCTC) adopted *Moving Dutchess Forward*, its current Metropolitan Transportation Plan (Plan), on July 27, 2021. Plans and Capital Programs (Transportation Improvement Programs, or TIPs) adopted or amended after the following dates must include performance targets for the measures listed here:

- May 27, 2018: Highway Safety Improvement Program (HSIP) and Highway Safety
- October 1, 2018: Transit Asset Management
- May 20, 2019: Pavement and Bridge Condition
- May 20, 2019: System Performance/Freight/Congestion Mitigation & Air Quality Improvement Program
- July 20, 2021: Transit Safety

MPOs must also include a system performance report in the Plan that describes the condition and performance of the transportation system with respect to required performance measures and targets, and reports on progress achieved in meeting the targets in comparison with baseline data and previous system performance reports.

We developed *Moving Dutchess Forward* in cooperation with our member agencies, including the New York State Department of Transportation (NYSDOT), Metropolitan Transportation Authority (MTA), and Dutchess County Public Transit. It reflects the investment priorities established by the MPO to improve transportation safety, reliability, and access to basic needs in Dutchess County, and incorporates feedback from stakeholder agencies and the public.

We believe this System Performance Report for *Moving Dutchess Forward* meets the requirements of 23USC §134(i)(2)(B)(C), while our current Capital Program meets the requirements of 23 USC §134(j)(2)(D). Each of the measures and targets is described below, along with a discussion of how the Plan addresses them.

Highway Safety

On March 15, 2016, the Federal Highway Administration (FHWA) published the final rule for the HSIP and Safety Performance Management (Safety PM) Measures in the *Federal Register* with an effective date of April 14, 2016. The rule finalized five roadway safety measures:

- Number of Fatalities
- Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT)
- Number of Serious Injuries
- Rate of Serious Injuries per 100 million VMT
- Number of Nonmotorized Fatalities and Serious Injuries

Each target is expressed as an annual five-year rolling average, which is the average of five individual, consecutive annual points of data. The five-year rolling average provides a smoothing effect for variations in data that may occur from year to year and helps to

better evaluate progress over time in a more consistent fashion than one based on single year peaks and valleys.

Safety Performance Targets

The 2017 New York Strategic Highway Safety Plan (SHSP) is intended to reduce "the number of fatalities and serious injuries resulting from motor vehicle crashes on public roads in New York State." The SHSP guides NYSDOT, the MPOs, and other safety partners in addressing safety and defines a framework for implementation activities to be carried out across New York State. The NYSDOT Highway Safety Improvement Program (HSIP) annual report documents the statewide performance targets.

On August 31, 2020, NYSDOT established statewide safety targets for calendar year 2021. Table 1 presents the 2021 safety targets as well as safety performance in recent years. We agreed to support the NYSDOT statewide 2021 targets on February 26, 2021 via Resolution #21-02.

Table 1. Statewide Safety Performance & 2021 Targets

Performance Measure	2016 5-yr Rolling Average (2012-2016)	2017 5-yr Rolling Average (2013-2017)	2018 5-yr Rolling Average (2014-2018)	2021 Targets
Number of Fatalities	1,120.0	1,085.2	1033.4	1,012.7
Rate of Fatalities per 100 million VMT	0.880	0.858	0.824	0.824
Number of Serious Injuries	11,444.8	11,241.8	11,170.0	10,896.8
Rate of Serious Injuries per 100 million VMT	8.964	8.888	8.876	8.865
Number of Combined Non-Motorized Fatalities and Non-Motorized Serious Injuries	2,841.0	2,737.0	2642.2	2,583.5

Highway Safety Progress

As shown in Table 1, the five-year rolling average for each safety measure decreased each year between 2016 and 2018. As part of the federal performance management requirements, FHWA completes an annual assessment of progress toward achieving safety targets for each state. A state made significant progress toward its safety targets when at least four of the five targets were met, or the actual outcome was better than the baseline performance. In 2020, FHWA assessed NYSDOT's progress toward achieving its 2018 safety targets and determined that NYSDOT has made significant progress.

NYSDOT continues to concentrate on the emphasis areas outlined in the 2017 SHSP. Those emphasis areas include intersections, lane departures, driver behavior, vulnerable users, speed, and older and younger drivers. The SHSP also emphasizes emergency response, data and automated/connected vehicles as cross cutting issues that affect all crash types. Site specific projects at high crash locations and systemic improvement projects are being implemented to meet crash goals. The first ever statewide New York State Pedestrian Safety Action Plan (PSAP) was released in June 2016 and provides funds to improve pedestrian safety in urban areas. The PSAP adds pedestrian locations to the state's annual regional work program, implements pedestrian improvements at approximately 2,400 signalized intersections and 1,350 uncontrolled crosswalks and supports pedestrian improvements on five pedestrian corridors. The PSAP also includes statewide pedestrian education and enforcement initiatives.

Highway Safety in *Moving Dutchess Forward*

Improving safety is a recurring theme in *Moving Dutchess Forward* and is embodied in our stated goal to "Provide safe and convenient access for all people to housing, jobs, goods, services, and recreational amenities, regardless of age, ability, race, income, location, or mode of transportation."

Our Plan answers two main questions about safe access: 1) Where are our high-crash locations? and 2) What conditions contribute to these high-crash locations? To answer these questions, we used the most recent five years of crash data (2015-2019) from NYSDOT and analyzed this data for three types of crashes: vehicle, pedestrian, and bicycle; and at three scales: corridors, segments, and intersections. For each analysis, we considered State, County, and local roads separately, and focused on locations with the highest crash rates.

Based on our analysis, Dutchess County averages more than 8,000 vehicular crashes each year. Of these, about 1,800 result in at least one injury, about 200 result in at least one serious injury, and about 20 crashes per year result in one or more deaths. Over the five years, Dutchess experienced almost 41,000 total crashes, resulting in almost 12,000 injuries, more than 1,100 serious injuries, and 109 deaths.

We also evaluated crash patterns across the county in terms of the top contributing factors. We reviewed the factors for all involved vehicles and calculated each factor's percentage of the total. For all crashes (including those on segments and at intersections), the most common crash factors included following too closely (15%), animal's action (13%), driver inattention (13%), and failure to yield right of way (10%).

To remove identified safety barriers, our Plan recommends the following MPO actions:

- Work with State, County, and local road owners to plan and implement projects that improve safety at high-crash locations.
- Develop a local road safety action plan to build on our crash analysis, with a focus on the highest-crash corridors and intersections. This would identify specific emphasis areas for improvements and recommend specific countermeasures for various crash types.
- Continue our safety assessments in partnership with road owners, and focus on the highest-crash corridors, segments, and intersections.
- Continue our high-end speeding evaluations and work with County Public Works to evaluate speed limits and identify locations where lower speed limits should be considered.
- Continue to collect count data for people walking and bicycling and pursue methods to estimate their crash exposure so that better comparisons can be made across locations.
- Develop countywide average crash rates so we can compare crash rates to a countywide average.
- Work with County GIS staff and other MPOs to develop an automated method to calculate intersection crash rates, which would allow us to screen all intersections to determine those with the highest crash rates.
- Improve our GIS data so we can incorporate elevation data into our GIS analysis, and consider creating our own intersection layer for future analyses.

Moving Dutchess Forward also recommends Transformative Projects and Packages to address barriers to safe access and make high crash locations safer:

- Market St. Two-way Redesign (City of Poughkeepsie): Redesign Market St., an identified high crash segment, from a one-way to a two-way street to improve local circulation, safety, walkability, and bicycle access.
- Arlington Main St. Redesign (Town of Poughkeepsie): Redesign Main St. (County Road 114) into a Complete Street. The Grand Ave. intersection is the third highest-crash County intersection for vehicles and highest-crash County intersection for pedestrians in the county, while the Taft Ave. intersection is the highest-crash State intersection in the county.
- Route 44/55 Arterials Redesign (City & Town of Poughkeepsie): Redesign the two Route 44/55 arterials from three-lane, one-way streets to two-lane streets with curb extensions and bike lanes. The corridors are the two highest-crash State corridors in the county for vehicles, pedestrians, and bicyclists. A segment of the corridors is also a State-designated Priority Improvement Location for safety, and the City and Town are one of 20 focus communities in the State's Pedestrian Safety Action Plan, based on the prevalence of pedestrian crashes.
- Route 9/44/55 Interchange Redesign (City of Poughkeepsie): Redesign the Route 9/44/55 interchange, a high-crash and high-conflict area, to improve traffic safety and

operations. In addition, the portion of northbound Route 9 adjacent to the interchange is a high-crash segment.

- I-84/Route 9D Interchange Improvements (Town of Fishkill): Redesign the I-84/Route 9D interchange to improve reliability and safety. Route 9D is a high-crash corridor and I-84 eastbound is a high-crash segment.
- Safety Improvements at High Crash Locations (countywide): Implement safety improvements to high crash locations, such as signage upgrades, pavement treatments and markings, guiderail upgrades, speed feedback devices, and traffic calming treatments, and also implement recommendations from past and future safety assessments and plans.

These investments total at least $197 million in transformative safety investment through 2045 and will help achieve the statewide safety targets.

Transit Asset Management

The Federal Transit Administration (FTA) published a final Transit Asset Management (TAM) rule on July 26, 2016. The 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 TAM plans, and establishes State of Good Repair (SGR) standards and performance measures for four transit asset categories: rolling stock, transit equipment, transit infrastructure, and facilities. Table 2 below identifies the federal transit asset performance measures.

Table 2. FTA TAM Performance Measures

Asset Category	Performance Measure
Rolling Stock	Percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark
Equipment	Percentage of non-revenue, support-service and maintenance vehicles that have met or exceeded their useful life benchmark
Infrastructure	Percentage of track segments with performance restrictions
Facilities	Percentage of facilities within an asset class rated below condition 3.0 on the Transit Economic Requirements Model (TERM) scale

For the TAM rule, FTA defines two tiers of public transportation providers based on size. Tier I providers are those that operate rail service or more than 100 vehicles in all fixed route modes, or more than 100 vehicles in one non-fixed route mode. Tier II providers are those that are a subrecipient of FTA 5311 funds, or an American Indian Tribe, or have 100

or fewer vehicles across all fixed route modes or have 100 vehicles or fewer in one non-fixed route mode. Tier I providers must establish their own transit asset management targets, while 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 established by a plan sponsor for the entire group. A state DOT is typically the group TAM plan sponsor.

The following providers operate in our county: the MTA (Tier I) and County Public Transit (Tier II). The MTA has established its own targets, while County Public Transit is participating in the New York State Group TAM Plan.

Baseline Conditions

Table 3 presents the baseline performance/conditions for applicable MTA assets used in Dutchess County (Note: no MTA buses operate in Dutchess County; data applies to the entire Metro-North Railroad system).

Table 3. Baseline Transit Asset Performance Measures & Baseline Conditions for MTA

Asset Category - Performance Measure	Asset Class	Useful Life Benchmark	Baseline Condition
Rolling Stock			
Age - % of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)	Bus	n/a	%
	Cutaway Bus	n/a	%
	Mini-Bus	n/a	%
	Van	n/a	%
	Other (Medium Heavy-Duty Bus)	n/a	%
Equipment			
Age - % of non-revenue vehicles within a particular asset class that have met or exceeded their ULB	Non-Revenue/Service Automobile	n/a	%
	Trucks and other Rubber Tire Vehicles	n/a	61%
	Maintenance Equipment	n/a	%
	Other	n/a	73%
Infrastructure			
% of track segments with performance restrictions (as applicable)	Rail fixed guideway track	n/a	2%
Facilities			
Condition - % of facilities with a condition rating below 3.0 on the FTA TERM Scale	Administration	n/a	28%
	Maintenance	n/a	34%
	Parking Structures	n/a	24%
	Passenger Facilities	n/a	40%
	Shelter	n/a	%
	Storage	n/a	%
	Other	n/a	%

TAM Performance Targets

Public transportation providers set transit asset targets annually and must provide the targets to each MPO in which the transit provider's projects and services are programmed in the MPO's Capital Program. MPOs must then approve targets, and do so again when updating Plans. 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.

As mentioned, County Public Transit is participating in the New York State Group TAM Plan, and the MTA set the transit asset targets listed in Table 4 on November 17, 2017. We agreed to support these transit asset targets on August 23, 2018 via Resolution #18-12.

Transit Access in *Moving Dutchess Forward*

Moving Dutchess Forward addresses the goals, objectives, performance measures, and targets as they are described in applicable TAM plans. The Plan's goal to provide safe and convenient access for all people, regardless of transportation mode, requires that bus and train assets be maintained in a state of good repair. We identify transit capital needs in the Plan and look at bus and train access across the county. To remove barriers to transit access, we recommend the following MPO actions, all of which require a well-maintained transit system:

- Work with County Public Transit to maximize the number of residents with frequent service.
- Work with County Public Transit to provide as much service coverage as possible without sacrificing service quality in high-demand areas.
- Work with County Public Transit to find alternatives to fixed-route transit service in low-density areas.
- Encourage improved transit service to key destinations.
- Work with County Public Transit to improve access to train stations, either with fixed-route service or alternative transit models.
- Advocate for access improvements for the Beacon station, including improved bus connections, and better walking and bicycling infrastructure.
- Work with the Town of Rhinebeck, NYSDOT, and Amtrak to improve access to the Rhinecliff station, with consideration of walking, bicycling, parking, and options for bus service.

Moving Dutchess Forward also recommends Transformative Projects and Packages to address barriers to transit access in Dutchess County:

- Transit Services for the Harlem Valley and Northern Dutchess: This project includes on-demand transit service in the Harlem Valley and Northern Dutchess, two under-served transit areas in the county.
- Bus Service Improvements: This package supports capital and operational needs to maintain bus service, such as basic maintenance, repairs, and bus replacements. It also includes new or improved bus service, such as more frequent service in core areas, additional service during off-peak times (such as evenings or weekends) where needed, and alternatives to fixed-route service in lower-density areas.
- Train Access Improvements: This package includes projects that improve access to train stations, such as sidewalks, wayfinding signage, bicycle parking, and bus pull-off areas. It also includes projects that address safety and reliability issues at train stations.

These projects total at least $359 million in transformative transit investment through 2045. This includes $97 million in identified capital investments to include bus replacements, facility improvements, and an eventual transition to Electric Vehicles for County Public Transit.

Table 4. Transit Asset Targets for the MTA

Asset Category - Performance Measure	Asset Class	Useful Life Benchmark	2021 Target
Rolling Stock			
Age - % of revenue vehicles within a particular asset class that have met or exceeded their ULB	Bus	X	%
	Cutaway Bus	X	%
	Mini-Bus	X	%
	Van	X	%
	Other (Commuter Rail Locomotive)	X	%
Equipment			
Age - % of non-revenue vehicles within a particular asset class that have met or exceeded their ULB	Non-Revenue/Service Automobile	X	%
	Trucks and other Rubber Tire Vehicles	X	61%
	Maintenance Equipment	X	%
	Other (Steel Wheel Vehicles)	X	73%
Infrastructure			
% of track segments with performance restrictions (as applicable)	Rail fixed guideway track	n/a	2%
Facilities			
Condition - % of facilities with a condition rating below 3.0 on the FTA TERM Scale	Administration	n/a	28%
	Maintenance	n/a	34%
	Parking Structures	n/a	24%
	Passenger Facilities	n/a	40%
	Shelter	n/a	%
	Storage	n/a	%
	Other (Define)	n/a	%

Pavement & Bridge Condition Measures (PM2)

FHWA published the Pavement and Bridge Condition Performance Measures Final Rule in January 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:

- Percent of Interstate pavements in good condition
- Percent of Interstate pavements in poor condition
- Percent of non-Interstate NHS pavements in good condition
- Percent of non-Interstate NHS pavements in poor condition
- Percent of NHS bridges (by deck area) classified as in good condition
- Percent of NHS bridges (by deck area) classified as in poor condition

Pavement Condition Measures

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. The PM2 rule defines NHS pavement types as either asphalt, jointed concrete, or continuously reinforced concrete pavement (CRCP), and defines five pavement condition metrics that states are to use to assess pavement condition:

- International Roughness Index (IRI) – an indicator of roughness; applicable to all three pavement types.
- Cracking percent – percentage of the pavement surface exhibiting cracking; applicable to all three pavement types.
- Rutting – extent of surface depressions; applicable to asphalt pavements only.
- Faulting – vertical misalignment of pavement joints; applicable to jointed concrete pavements only.
- Present Serviceability Rating (PSR) – a quality rating that is applicable only to NHS roads with posted speed limits of less than 40 miles per hour, for example toll plazas and border crossings. A state may choose to collect and report PSR for applicable segments as an alternative to the other four metrics.

For each pavement metric, a threshold is used to establish good, fair, or poor condition. Table 5 lists the thresholds. Using these metrics and thresholds, pavement condition is assessed for each tenth of a mile section of the through travel lanes of mainline highways on the Interstate or the non-Interstate NHS, as follows:

- Asphalt segments are assessed using the IRI, cracking, and rutting metrics, while jointed concrete segments are assessed using IRI, cracking, and faulting. For these two

pavement types, each segment is rated good if the rating for all three metrics are good, and poor if the ratings for two or more metrics are poor.
- Continuous concrete segments are assessed using the IRI and cracking metrics. A segment is rated good if both metrics are rated good, and poor if both metrics are rated poor.
- If a state collects and reports PSR for any applicable pavement segments, those segments are rated according to the PSR scale in Table 5.

For all three pavement types, sections that are not good or poor are rated fair.

Table 5. Pavement Condition Metric Performance Thresholds

Metric Rating	Good	Fair	Poor
IRI (inches/mile) (Applies to all pavements)	< 95	95 – 170	> 170
Cracking Percent (%) (Applies to all pavements)	< 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

The good/poor pavement condition 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. Pavement in poor condition suggests major reconstruction investment is needed in the near term.

Bridge Condition Measures

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

Each bridge component has a metric rating threshold to establish good, fair, or poor condition, as shown in Table 6. 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 6. Bridge Condition Performance Rating Thresholds

Metric Rating	Good	Fair	Poor
Deck	≥ 7	5 or 6	≤ 4
Superstructure	≥ 7	5 or 6	≤ 4
Substructure	≥ 7	5 or 6	≤ 4
Culvert	≥ 7	5 or 6	≤ 4

The bridge condition 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 calculated 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.

Pavement & Bridge Condition Performance Target Requirements

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. NYSDOT 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
- 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 expected pavement and bridge condition at the end of calendar years 2019 and 2021, respectively.

NYSDOT Pavement & Bridge Condition Baseline Performance & Established Targets

This system performance report discusses performance for each applicable measure as well as the progress achieved by us in meeting targets in comparison with system performance recorded in previous reports. The federal performance measures are new and therefore, performance of the system for each measure and associated targets have only recently been assessed and developed. NYSDOT collects and reports pavement and bridge condition data to FHWA each year to track performance and progress toward targets. Accordingly, this first system performance report highlights performance for the baseline period of 2017 and at the midpoint of the first performance period, which is 2019. NYSDOT will continue to monitor pavement and bridge condition performance and report to FHWA on an ongoing basis. Future system performance reports will discuss progress towards meeting the targets since this initial baseline report.

NYSDOT established statewide PM2 targets on May 20, 2018. We were then required to establish PM2 targets no later than November 16, 2018. We agreed to support NYSDOT's PM2 performance targets on August 23, 2018 via Resolution #18-11. By adopting NYSDOT's targets, we agree to plan and program projects that help NYSDOT achieve these targets.

Table 7 presents baseline and 2019 performance for each PM2 measure for New York as well as the two-year and four-year statewide targets established by NYSDOT.

Table 7. Pavement and Bridge Condition (PM2) Performance and Targets

Performance Measures	New York Performance 2017 Baseline	New York 2019 Actual Performance	New York 2-year Target (2019)	New York 4-year Target (2021)
Percent of Interstate pavements in good condition	N/A*	51.1%	N/A*	47.3%
Percent of Interstate pavements in poor condition	N/A*	1.1%	N/A*	4.0%
Percent of non-Interstate NHS pavements in good condition	36.7%	37.2%	14.6%	14.7%
Percent of non-Interstate NHS pavements in poor condition	26.7%	26.3%	12.0%	14.3%
Percent of NHS bridges (by deck area) in good condition	22.8%	26.0%	23.0%	24.0%
Percent of NHS bridges (by deck area) in poor condition	10.6%	9.6%	11.6%	11.7%

**For the first performance period only (January 1, 2018 through December 31, 2021), baseline condition and 2-year targets are not required for the Interstate pavement condition measures.*

In the fall of 2020 NYSDOT completed an assessment of pavement and bridge condition for 2018 and 2019 for the State's Mid Performance Period Report to FHWA. As shown in Table 7, pavement condition on the non-Interstate NHS improved slightly between 2017 and 2019, increasing the percent in Good condition from 36.7% to 37.2%, and reducing the percent in Poor condition from 26.7% to 26.3%. Note that a direct comparison between baseline and 2019 results and targets for non-Interstate NHS pavement in Table 7 cannot be made, due to different calculation methodologies used for the targets.

For Interstate pavement, a 2017 baseline and two-year target were not required for this first performance period, however, performance in 2019 is exceeding the four-year targets, and given the current trajectory it is likely the four-year targets will be met.

For bridges, NYSDOT has made positive progress in attaining and exceeding its target for bridge deck area in Good condition, increasing from 22.8% to 26% between 2017 and 2019 and exceeding the two-year target of 23% percent by three percentage points. NYSDOT has made progress in attaining and exceeding its target for bridge deck area rated in Poor condition, reducing its percentage of Poor deck area from the baseline of 10.6% to 9.6%, which is a decrease of approximately 10% and exceeds the two-year target of 11.6%.

In October 2022 NYSDOT will report pavement and bridge performance for the last two years of the performance period to FHWA, as well as progress toward achieving the four-

year targets. At the same time. NYSDOT will also report new two-year and four-year targets for the next performance period. Future DCTC System Performance Reports will incorporate this information.

Road & Bridge Maintenance in *Moving Dutchess Forward*

Moving Dutchess Forward stresses the preservation of the transportation system and identifies infrastructure needs within Dutchess County. The Plan provides substantial funding for targeted road and bridge improvements and dedicates a Transformative Package to improve road and bridge conditions in Dutchess County. The package includes the following items:

- Road Maintenance: Repave 327 miles of federal-aid eligible roads, to include 161 miles on the NHS (this includes 15 miles of I-84, the sole Interstate in Dutchess).
- Bridge Maintenance: Replace 71 bridges, to include 24 on the NHS and eight on other federal-aid eligible roads.

These repaving and bridge replacement recommendations total $360 million in investment. We also recommend an additional $274 million to conduct routine maintenance on roads, bridges, and to support highway operations. Combined, these total $634 million through 2045. Though not itemized above, some of our recommended Transformative Projects will also support and preserve our most strategic roads and bridges. These include the redesign of the Route 9/44/55 and I-84/Route 9D interchanges, which are NHS facilities. These will collectively help NYSDOT achieve its statewide PM2 targets.

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

On January 18, 2017, FHWA published the system performance, freight, and Congestion, Mitigation and Air Quality Improvement Program (CMAQ) Performance Measures Final Rule in the *Federal Register*. This third FHWA performance measure rule (PM3), which has an effective date of May 20, 2017, established six performance measures to assess the performance of the NHS, freight movement on the Interstate System, and traffic congestion and on-road mobile source emissions for the CMAQ Program. The performance measures are:

For the National Highway Performance Program (NHPP)

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

For the National Highway Freight Program (NHFP)
- Truck Travel Time Reliability Index (TTTR)

For the CMAQ Program
- Annual hours of peak hour excessive delay per capita (PHED)
- Percent of non-single occupant vehicle travel (Non-SOV)
- Cumulative two-year and four-year reduction of on-road mobile source emissions for CMAQ funded projects (CMAQ Emission Reduction)

The three CMAQ performance measures listed above are applicable only to designated nonattainment areas or maintenance areas for National Ambient Air Quality Standards by the Environmental Protection Agency. We meet all current air quality standards and are not subject to establishing targets for these performance measures. The remaining performance measures are described below.

Level of Travel Time Reliability (LOTTR) Measures

Travel time reliability refers to the consistency or dependability of travel times on a roadway from day to day or across different times of the day. For example, if driving a certain route always takes about the same amount of time, that segment is reliable. It may be congested most of the time, not congested most of the time, or somewhere in between, but the conditions are consistent. On the other hand, if driving that route takes 20 minutes on some occasions but 45 minutes on other occasions, travel time on the route is not reliable.

The LOTTR is defined as the ratio of the longer travel times (80th percentile) to a normal travel time (50th percentile) on applicable roads during four time periods between 6 a.m. to 8 p.m. each day (AM peak, Mid-day, PM peak, and weekends). The LOTTR ratio is calculated for each roadway segment. The 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. By using person-miles, the measures consider the total number of people traveling in buses, cars, and trucks over these roadway segments. To obtain total person-miles traveled, the length of each segment is multiplied by an average vehicle occupancy for each type of vehicle on the roadway.

The sum of person-miles on reliable segments is divided by the sum of person-miles on all segments to determine the percent of person-miles traveled that are reliable.

Truck Travel Time Reliability Index (TTTR) Measure

The TTTR measure assesses travel time 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 on weekdays and weekends (AM peak, Mid-day, PM peak, weekend, and overnight). The time periods cover all hours of the day.

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

Travel Time Data

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

PM3 Performance Target Requirements

Performance for the PM3 measures is assessed over a series of four-year performance periods. States must report baseline performance and targets during the first part of the performance period and update performance at the midpoint and end of each performance period. For the LOTTR and TTTR measures, the first performance period began on January 1, 2018 and runs through December 31, 2021.

The PM3 rule requires state DOTs and MPOs to establish performance targets for each measure and monitor progress towards achieving the targets. NYSDOT must establish two-year and four-year state targets for the Interstate LOTTR, TTTR, Non-SOV Travel, and CMAQ Emission Reduction measures. For the non-Interstate NHS LOTTR and PHED measures, NYSDOT must establish four-year targets.

Within 180 days of NYSDOT establishing targets, MPOs must establish four-year performance targets for both LOTTR measures, the TTTR measure, and, if applicable, the CMAQ Emission Reduction measure. MPOs establish targets by either agreeing to program projects that will support the State's targets or setting quantifiable targets for the MPO's planning area.

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

NYSDOT PM3 Baseline Performance & Established Targets

This system performance report discusses performance for each applicable target as well as the progress achieved by DCTC in meeting targets in comparison with system performance recorded in previous reports. NYSDOT collects and reports system performance data to FHWA each year to track performance and progress toward targets. Accordingly, this first Plan system performance report highlights performance for the baseline period prior to 2018 and at the midpoint of the first performance period, which is 2019. NYSDOT will continue to monitor performance and report to FHWA on an ongoing basis. Future system performance reports will discuss progress towards meeting the targets since this initial baseline report.

NYSDOT established PM3 targets on May 20, 2018. In consultation with the New York MPOs, NYSDOT subsequently recalculated and amended the State's LOTTR targets after discovering an error in the formula used to determine the 2018 baseline. We were required to establish PM3 targets no later than November 16, 2018, and we agreed to support NYSDOT's PM3 performance targets on August 23, 2018 via Resolution #18-11. By adopting NYSDOT's targets, we agree to plan and program projects that help NYSDOT achieve the State's targets.

Table 8 presents baseline and 2019 performance for the LOTTR and TTTR measures for New York, as well as the two-year and four-year targets established by NYSDOT.

Table 8. System Performance & Freight (PM3) Performance Measures & Targets

Performance Measures	New York Performance 2017 Baseline	New York 2019 Actual Performance	New York 2-year Target (2019)	New York 4-year Target (2021)
Percent of person-miles on the Interstate system that are reliable (Interstate LOTTR)	83.2%	78.8%	73.1%	73.0%
Percent of person-miles on the non-Interstate NHS that are reliable (Non-Interstate NHS LOTTR)	77.0%	80.3%	N/A	63.4%
Truck travel time reliability index (TTTR)	1.39	1.47	2.00	2.11

In late 2020 NYSDOT completed and assessment of system performance measures for 2018 and 2019 for the State's Mid Performance Period Report to FHWA. As shown in Table 8, the percent of person-miles on the Interstate system that are reliable in 2019

(78.8%) decreased from the baseline but remains well above the two-year target of 73.1%. For the non-Interstate NHS, a 2017 baseline and two-year targets were not required for this first performance period, however, performance in 2019 is exceeding the four-year target and it is likely the four-year target will be met.

TTTR decreased slightly between 2017 and 2019 from 1.39 to 1.47. However, performance in 2019 exceeded the two-year target and is well below the four-year target.

In late 2022, NYSDOT will report system performance results for the last two years of the performance period (2020 and 2021) to FHWA, as well as progress toward achieving the four-year targets. At the same time NYSDOT will also report new two-year and four-year targets for the next performance period. Our future System Performance Reports will incorporate this information.

Reliable Access in *Moving Dutchess Forward*

Moving Dutchess Forward addresses system performance and reliability, identifies infrastructure needs within Dutchess County, and provides funding for targeted improvements. We recognize that congestion is a barrier to reliable access and managing it is important to our economy, environment, and quality of life. We note that congestion is often a land use problem, caused by sprawling development patterns, poor access management, and a lack of interconnected street networks, as well as limited transportation options.

The Plan relies on work we did in 2018, along with our partners in Ulster and Orange counties, to update our Congestion Management Process (CMP). We used a data analysis platform developed by the University of Albany's AVAIL Labs that uses anonymous GPS data to map travel speeds, allowing us to find congested areas. We chose four congestion measures (LOTTR and TTTR as shown in Table 8, and TTI-Travel Time Index) and TED per mile (Total Excessive Delay per mile) to screen the three-county area. For the most congested locations, we examined the causes of congestion and made preliminary recommendations for improvements or future study. Based on this analysis, we identified the following priority congested locations:

- I-84 and Route 9D in Fishkill
- I-84, Route 9, and Route 52 in Fishkill
- Route 55 just west of the Taconic State Parkway in LaGrange
- Route 44/55 near Route 9 in the City of Poughkeepsie

To improve reliability, our Plan recommends the following actions:

- Work with municipalities and road owners on proposed improvements, and if an improvement to a congested area proceeds past the planning stage, continue to advise on the project to ensure that the plan's goals are reflected in the final design.
- Collect and maintain data on high-congestion areas. Continue to use the AVAIL Labs platform, along with traffic volume, vehicle class, and other locally collected traffic data.
- Update the Congestion Management Process regularly (likely after 2021 data becomes available).
- Pursue planning studies of high-congestion locations as funding allows (e.g. our Poughkeepsie 9.44.55 study of Route 44/55 in Poughkeepsie).
- Consider impacts on congested locations when reviewing new land use projects. Work with developers and municipalities during comprehensive planning, zoning, and site plan review processes to mitigate impacts from new development on congested locations.

Moving Dutchess Forward recommends the following Transformative Projects and Packages to address congested locations in Dutchess County (many of these are also high crash locations):

- Route 44/55 Arterials Redesign (City & Town of Poughkeepsie): Redesign the two Route 44/55 arterials from three-lane, one-way streets to two-lane streets with curb extensions and bike lanes. A portion of the northern (westbound) arterial is a priority High Congestion Segment.
- Route 9/44/55 Interchange Redesign (City of Poughkeepsie): Redesign the Route 9/44/55 interchange to improve traffic safety and operations. The approach to the interchange is a priority High Congestion Segment and a portion of the interchange is also a High Congestion Segment.
- I-84/Route 9D Interchange Improvements (Town of Fishkill): Redesign the greater I-84/Route 9D interchange to improve reliability and safety. The interchange is one of the four most congested areas in the county based on our traffic congestion analysis and includes several priority High Congestion Segments.
- Congestion Management & Traffic Operations (countywide): This package includes projects that address congested areas and improve traffic operations, such as turn pockets, signal timing changes, roundabouts, and access management. It also includes technology solutions to move vehicles (including freight) more efficiently.

These projects total at least $157 million in transformative investment to improve reliability through 2045 and will help NYSDOT achieve its statewide PM3 targets.

Transit Safety

The FTA published a final Public Transportation Agency Safety Plan (PTSAP) rule on July 19, 2018. Under this rulemaking, providers of public transportation systems that are a recipient or sub-recipient of FTA Urbanized Area Formula Grant Program funds under 49 U.S.C. Section 5307, or that operate a rail transit system that is subject to FTA's State Safety Oversight Program, must develop and implement a PTASP based on a Safety Management Systems approach.

PTASP requirements do not apply to transit modes that are subject to the safety jurisdiction of another Federal agency, such as passenger ferry operations regulated by the United States Coast Guard and commuter rail operations that are regulated by the Federal Railroad Administration.

A provider's PTASP must include targets for the performance measures established by FTA in the National Public Transportation Safety Plan, which was published on January 28, 2017. The transit safety performance measures are:

- Total number of reportable fatalities by mode.
- Reportable fatality rate per total vehicle revenue miles by mode.
- Total number of reportable injuries by mode.
- Rate of reportable injuries per total vehicle revenue miles by mode.
- Total number of reportable safety events by mode.
- Rate of reportable safety events per total vehicle revenue miles by mode.
- System reliability – mean distance between major mechanical failures by mode.

Providers subject to the rule must certify a PTASP, including transit safety targets for the above measures. The date by which providers must do so was initially July 20, 2020. However, FTA extended the deadline to July 20, 2021 to provide regulatory flexibility due to the operational challenges presented by the COVID public health emergency.

When the public transportation provider establishes targets, it must make the targets available to MPOs to aid in the planning process. MPOs have 180 days after receipt of the PTASP targets to establish transit safety targets for the MPO planning area. The MPO must reflect those targets in any Plan and Capital Program updated on or after July 20, 2021.

The MTA and County Public Transit are the only transit providers in Dutchess County that are subject to the PTASP rule. They are responsible for developing a PTASP and establishing transit safety targets annually. However, a PTASP is not required for Commuter Railroads such as Metro-North Railroad since they fall under the Federal

Railroads Administration's jurisdiction for safety. Accordingly, we have taken no action on Metro-North's PTASP but will do so for County Public Transit.

Transit Safety Targets

Table 9 presents the transit safety measures and targets established by County Public Transit for our planning area. These were established as part of their PTASP that was completed on May 11, 2021.

Table 9. Transit Safety Performance Measures & Targets for Dutchess County Public Transit

Transit Mode	Fatalities (total)	Fatalities (specify rate)	Injuries (total)	Injuries (specify rate)	Safety Events (total)	Safety Events (specify rate)	System Reliability
Fixed Route Bus	0	0	2	0.16	1	0.08	30,825
Demand Response	0	0	2	1.11	1	0.55	12,814

We will support County Public Transit's transit safety measures and targets on July xx, 2021 via Resolution #21-xx, agreeing to plan and program projects that are anticipated to make progress toward achieving the targets.

The transit safety performance measures are new. Performance for each measure has only recently been assessed and initial targets have been developed. Accordingly, this System Performance Report highlights the initial targets. Future system performance reports will discuss transit safety performance and progress towards meeting the targets over time.

Transit Safety in *Moving Dutchess Forward*

Moving Dutchess Forward reflects the goals, objectives, performance measures, and targets as they are described in other public transportation plans and processes, including County Public Transit's PTASP. Beyond maintaining transit equipment to promote safe access, the Plan stresses the importance of safe walking and bicycling access to bus stops and train stations in the county. It also analyzes sidewalk coverage within a half-mile of stops and stations to identify access gaps.

Recognizing that safe and convenient walking and bicycling access to transit is essential to a functional transit system, the Plan identifies the following actions:

- Improve sidewalk access to train stations, and consider station access when evaluating priorities for federal, State, and County funding programs.
- Advocate for secure long-term bicycle parking, especially at the Beacon and Poughkeepsie stations.
- Advocate for access improvements for the Beacon station, including better walking and bicycling infrastructure (as identified in our Beekman Street Complete Streets Analysis).
- Work with the Town of Rhinebeck, NYSDOT, and Amtrak to improve access to the Rhinecliff station, including walking, bicycling, and parking.

Moving Dutchess Forward also recommends Transformative Packages to improve safe access to bus stops and train stations:

- Walking & Bicycling Improvements: This package includes sidewalk repairs and replacements, new sidewalks, improved crossings, shoulders or sidewalks on bridges, wider shoulders and bike lanes on State, County, and local roads. It also addresses access to County facilities, roads, and the bus system, including improvements at County bus stops such as shelters, sidewalks, and ramps.
- Train Access Improvements: This package includes projects that improve walking, bicycling, and transit access to train stations, such as sidewalks, wayfinding signage, bicycle parking, and bus pull-off areas. It also includes projects that address safety and congestion issues at train stations.

These projects total at least $106 million in investment to improve walking and bicycling access through 2045, including to bus stops and train stations.

Next Steps

We will republish this System Performance Report to update our progress in attaining established targets or to document new targets established by responsible agencies. We will also update this report to reflect any new targets established by us, specific to our planning area.