2024 REVIEW & UPDATE OF VISION 2050

This document represents one of the seven elements of the 2024 Review and Update of VISION 2050, which is documented in Memorandum Report No. 268.

Prepared by the Southeastern Wisconsin Regional Planning Commission

June 2024

4 REVIEW OF TARGETS ESTABLISHED FOR THE NATIONAL PERFORMANCE MEASURES

2024 REVIEW & UPDATE OF VISION 2050

The Review & Update Process

REVIEW

What did VISION 2050 recommend before the 2024 Update?

How have these recommendations been implemented in recent years?

1 RECOMMENDATIONS & IMPLEMENTATION

2 FORECASTS

Are the long-term demographic, economic, and travel forecasts that underlie the plan still valid?

How is the Region's transportation system performing since plan development?

3 TRANSPORTATION SYSTEM PERFORMANCE

4 TARGETS FOR NATIONAL PERFORMANCE MEASURES

How is the Region tracking in relation to targets set for various transportation performance measures? Are new or updated targets needed?

UPDATE

5 UPDATES TO RECOMMENDATIONS

Should any VISION 2050 plan recommendations be updated or added, based on findings from "Review" elements and public input?

6 FINANCIAL ANALYSIS

Can the Region's expected transportation revenues fund the VISION 2050 transportation system?

If not, what portion of the system can we expect to fund ("fiscally constrained transportation system")?

7 EQUITY ANALYSIS

What are the benefits and impacts of the VISION 2050 and fiscally constrained transportation systems on traditionally underserved populations?

INTRODUCTION

This document, titled *Review of Targets Established for the National Performance Measures*, was largely prepared in late 2023 as one of the initial elements of the 2024 Review and Update of VISION 2050, which is documented in Memorandum Report No. 268.

To establish a consistent nationwide process for monitoring the effectiveness of Federal transportation investments, the Moving Ahead for Progress in the 21st Century (MAP-21), enacted in 2012, created a framework for a national performance management approach to transportation decision-making on investments with Federal highway and transit funding. In implementing the performance management approach, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) have developed specific highway and transit performance measures, and requirements for States, transit operators, and metropolitan planning organizations (MPOs) in establishing and reporting short-term (two- to four-year) targets, along with monitoring achievement of the targets, for each performance measure. The performance measures established by FHWA and FTA can be found in Table 1. Per Federal regulations, targets are to be established annually for the transit asset management (TAM), transit safety, and highway safety performance measures, and every four years for the National Highway System (NHS) condition and reliability, freight reliability, and congestion mitigation and air quality improvement (CMAQ) performance measures. The short-term targets are required to be established as appropriate for the individual performance measures within a four-year performance cycle, with the initial cycle covering the years 2018-2021. Depending on the performance measure, the targets are required to be established either for the Southeastern Wisconsin metropolitan planning area (MPA) or for a specific urbanized area—initially the Milwaukee urbanized area. Map 1 shows the MPA and the urbanized areas in Southeastern Wisconsin.

As part of establishing targets in the initial four-year performance cycle, the Southeastern Wisconsin Regional Planning Commission established targets in June 2018 for the highway safety performance measures and in June 2019 for the TAM, NHS condition and reliability, freight reliability, and CMAQ performance measures as part of amendments to VISION 2050.[1] Per the Federal regulations, these targets were documented in the 2020 Review and Update of VISION 2050. In addition, the Commission has also included in the transportation improvement program (TIP)[2] a description of how the projects programmed in the TIP would promote the achievement of the performance targets. The remaining transit safety performance measures were documented in the TIP in July 2021, following the establishment of transit safety targets by the Region's transit operators in coordination with the Commission and State.

On December 7, 2023, FHWA finalized regulations creating a performance measure related to the greenhouse gas (GHG) emissions on the NHS. Like with the other national performance measures, States and MPOs would be required to establish and monitor achievement of short-term targets related to the percent reduction of tailpipe CO2 emissions on the NHS. Specifically, WisDOT was to establish years 2023 and 2025 targets by February 1, 2024, and the Commission was to establish a year 2025 target for the urbanized areas in the Region by July 30, 2024. However, on March 27, 2024, a U.S. District Court nullified implementation of the finalized GHG performance measure regulation nationwide. In response, FHWA advised States and MPOs that they would no longer be required to submit initial targets and reports as initially required. Despite this, Commission staff are in the process of establishing short-term targets using the new GHG performance measure, which is expected to be completed in late 2024/early 2025.

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[1] *The development of the highway safety targets is documented in a Commission report entitled,* First Amendment to VISION 2050: A Regional Land Use and Transportation Plan for Southeastern Wisconsin, Establishing Targets for Federal Performance Measures: Highway Safety. *The remaining targets established to date are documented in a Commission report entitled,* Third Amendment to VISION 2050: A Regional Land Use and Transportation Plan for Southeastern Wisconsin, Establishing Targets for Federal Performance Measures: Transit Asset Management, National Highway System Condition and Performance, Freight Performance, and Congestion Mitigation and Air Quality Improvement.

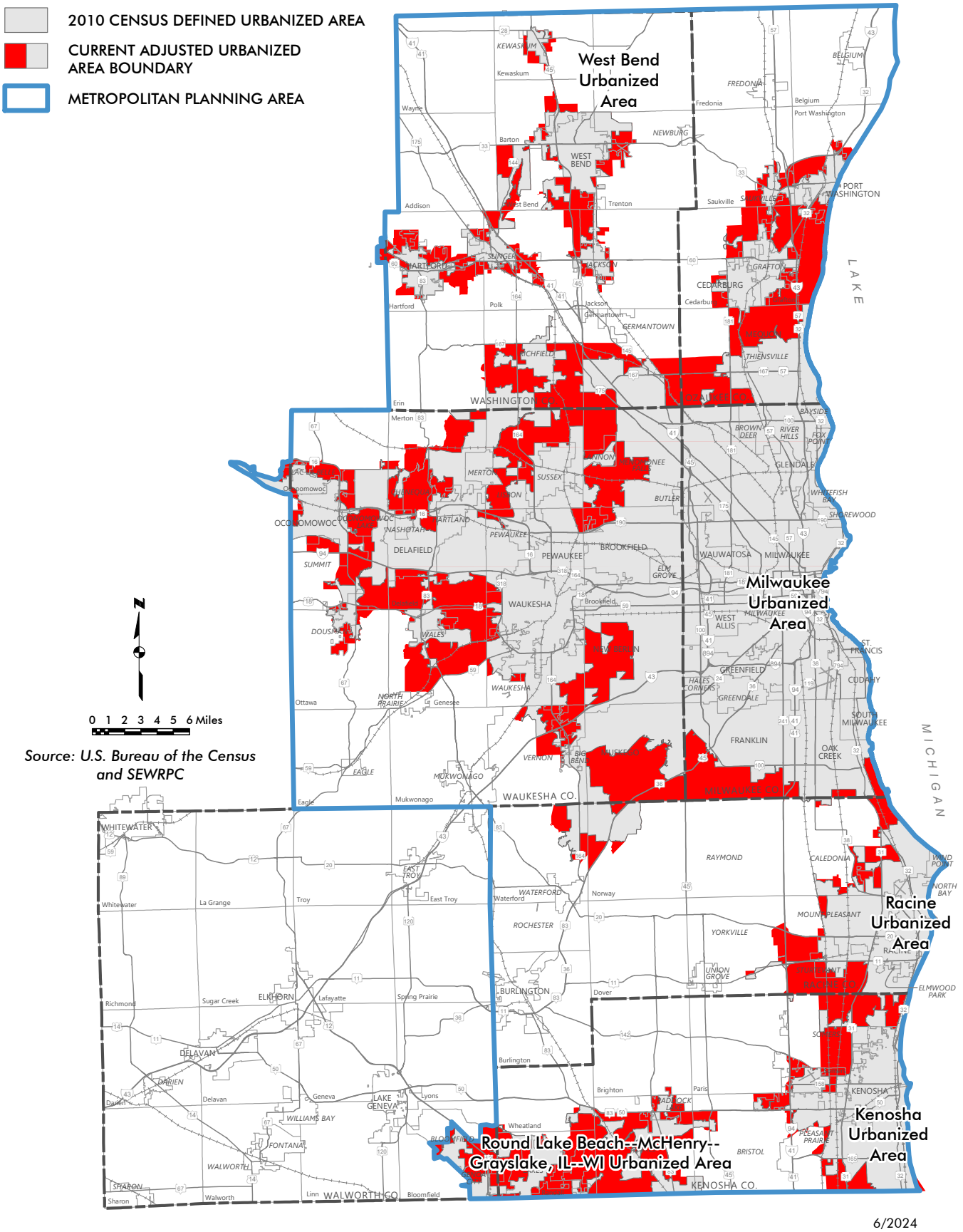
[2] *The current TIP is documented in a Commission report entitled,* A Transportation Improvement Program for Southeastern Wisconsin: 2023-2026.

Table 1
Transit Asset Management, Transit Safety, Highway Safety, National Highway System, Freight, and Congestion Mitigation and Air Quality Transportation Performance Measures Developed by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA)

Performance Measure Area	Performance Measure
FHWA Highway Safety Improvement Program (HSIP)	
Number of Fatalities and Serious Injuries	Number of Fatalities Number of Serious Injuries Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries
Rate of Fatalities and Serious Injuries	Rate of Fatalities per 100 Million Vehicle-Miles Traveled (MVMT) Rate of Serious Injuries per 100 MVMT
FHWA National Highway Performance Program (NHPP)	
Condition of Pavements on the Interstate System	Percentage of Pavement of the Interstate System in Good Condition Percentage of Pavement of the Interstate System in Poor Condition
Condition of Pavements on the National Highway System (NHS) Excluding the Interstate	Percentage of Pavement of the Non-Interstate NHS in Good Condition Percentage of Pavement of the Non-Interstate NHS in Poor condition
Condition of Bridges on the NHS	Percentage of NHS Bridges Classified as in Good Condition Percentage of NHS Bridges Classified as in Poor Condition
Performance of the Interstate System	Percentage of the Person-Miles Traveled on the Interstate that are Reliable
Performance of the NHS Excluding the Interstate	Percentage of the Person-Miles Traveled on the Non-interstate NHS that are Reliable
Greenhouse Gas Emissions	Percent Change of NHS Tailpipe CO2 Emissions
FHWA National Highway Freight Program (NHFP)	
Freight Movement on the Interstate System	Freight Reliability Index
FHWA Congestion Mitigation and Air Quality Improvement Program (CMAQ)	
On-Road Source Emissions	Estimate of Emission Reductions for Projects Funded by CMAQ
Traffic Congestion	Peak Hour Excessive Delay (PHED) Per Capita Percentage of Non-Single Occupancy Vehicles
FTA Section 53 Funding (including Sections 5307, 5310, 5311, 5337, and 5339)	
Transit Asset Management	Percentage of Revenue Vehicles at or Exceeding the Useful Life Benchmark (ULB) Percentage of Vehicles and Equipment at or Exceeding the ULB Percentage of Facilities Exceeding the Transit Economic Requirements Model (TERM) Scale Percentage of Track Segments Having Performance Restrictions
Transit Safety	Number of Reportable Fatalities Rate of Reportable Fatalities per Vehicle-Revenue Mile Number of Reportable Injuries Rate of Reportable Injuries per Vehicle-Revenue Mile Number of Reportable Events Rate of Reportable Events per Vehicle-Revenue Mile Mean Distance Between Major Mechanical Failures

Source: Federal Highway Administration, Federal Transit Administration, and SEWRPC; 12/2023

Map 1
The Southeastern Wisconsin Metropolitan Planning Area and Census Defined and Adjusted Urbanized Area Boundaries: 2010



Source: U.S. Bureau of the Census and SEWRPC

6/2024

In the establishment of a short-range target-setting process into VISION 2050, a long-range plan, it was determined that long-term regional targets should be established, as appropriate, for the TAM, highway safety, NHS, freight, and CMAQ performance measures. The establishment of the short-term targets for the MPA, as required as part of the national performance measure framework, was based on the long-term regional targets.

With respect to establishing long-term TAM, highway safety, NHS, freight, and CMAQ targets, the following process was used:

1. Baseline data for each of the measures was developed for the Region, plus those portions of Jefferson and Dodge Counties within the MPA.

2. The methodologies used by transit operators and WisDOT to establish their targets were reviewed.

3. Historical regional trends, as available, of the performance measures were reviewed.

4. The relevant recommendations of VISION 2050 and other State and regional plans were reviewed to determine their potential effect on the performance measures in the Region.

5. Based on the evaluations of the historical trends and the review of relevant recommendations of VISION 2050 and other plans, preliminary recommended year 2050 targets for each performance measure were developed for inclusion in VISION 2050.

The remainder of this document summarizes for each Federal performance measure the established long-term regional targets, the monitoring of achievement of the short-term targets established for the initial four-year performance period (2018-2021) based on the actual data, and the establishment of new short-term targets, as necessary, for the next four-year performance cycle (2022-2025). In addition, this document includes recommended revisions to certain long-term targets based on either additional data that have become available since the initial establishing of targets or the correction to the baseline data that were utilized to establish the targets. While there may be consequences to the State for not making progress towards achieving targets or meeting minimum thresholds, as indicated in Federal regulations, there are no such consequences for MPOs not doing so.

TRANSIT ASSET MANAGEMENT TARGETS

As part of the national performance management framework, FTA developed regulations for monitoring the condition of transit assets nationwide. Specifically, FTA developed four transit performance measures for target-setting purposes: 1) the percentage of revenue vehicles at or exceeding the Useful Life Benchmark (ULB), 2) the percentage of vehicles and equipment at or exceeding the ULB, 3) the percentage of facilities exceeding the Transit Economic Requirements Model (TERM) scale, and 4) the percentage of track segments having performance restrictions. The methodology for calculating these measures is shown in Figure 1. The TAM performance measures are calculated based on the data that transit operators annually submit to FTA on their assets and system operation for inclusion in the National Transit Database (NTD). Transit operators are required, as part of the framework, to report asset inventory, condition, and performance information to the NTD. Performance of transit equipment, facilities, and infrastructure are addressed in TAM plans, to be submitted to FTA every four years, with the most recent iteration occurring in 2022.

Table 2 shows the year 2050 targets for each of the TAM performance measures. While current funding levels make it difficult for transit operators to maintain the desired replacement of buses every 12 years, the TAM targets were established based on the VISION 2050 recommendations for the more than doubling of transit service by the year 2050 and the associated substantial investment in transit assets that would occur if that doubling is achieved. Specifically, the year 2050 targets for the rolling stock (revenue and non-revenue vehicles) owned by the transit operators were based on a vehicle being replaced on average one year before exceeding its Federally defined maximum useful life. The targets

Figure 1
Methodology for Calculating the Transit Asset Management Performance Measures

The following is the methodology developed by FTA for calculating the following four TAM performance measures:

- Percent of revenue vehicles that have either met or exceeded their useful life benchmarks (ULB)
- Percent of vehicles and equipment that have either met or exceeded their ULB
- Percent of segments that have performance restrictions
- Percent of facilities exceeding the Transit Economic Requirements Model (TERM) scale

1. As part of the national performance management framework, transit operators are required to conduct an inventory of their transit assets as outlined in the following table:

Transit Asset Category	Asset Class	Applicable Assets
Rolling Stock	All revenue vehicles used in the provision of public transit	Only revenue vehicles with direct capital responsibility
Equipment	All non-revenue service vehicles and equipment over $50,000 used in the provision of public transit, except third-party equipment assets	Only non-revenue service vehicles with direct capital responsibility
Infrastructure	All guideway infrastructure used in the provision of public transit	Only fixed-rail guideway with direct capital responsibility
Facilities	All passenger stations and all exclusive-use maintenance facilities used in the provision of public transit, excluding bus shelters	Maintenance and administrative facilities with direct capital responsibility. Passenger stations (buildings) and parking facilities with direct capital responsibility.

2. Calculate each performance measure, based on the number of assets under each transit asset category that are not in state-of-good repair. For rolling stock and non-revenue service vehicles, the state-of-good repair is identified based on the useful life benchmarks (ULB) from FTA's *Transit Database Asset Inventory Module*. The identification of the state-of-good repair for infrastructure and facilities is based on FTA's Transit Economic Requirements Model (TERM) scale, as provided in the *TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation*.

Source: Federal Transit Administration and SEWRPC, 12/2023

Table 2
Short-Term and Year 2050 Long-Term Regional Transit Asset Management Targets[a]

Asset Class	Asset Examples	Performance Measure	Recommended Year 2050 Target	Short-Term Target
		Rolling Stock		
Buses, Other Passenger Vehicles, and Railcars	Bus, Cutaway, Van, Minivan, and Streetcars	Percent of revenue vehicles that have either met or exceeded their useful life benchmark	< 10	< 30
		Equipment		
Non-Revenue Service Vehicles and Equipment Over $50,000	Route Supervisor Vehicles, Maintenance Trucks, Pool Vehicles, DPF Cleaning System, Bus Wash Systems, Fare Collection Systems, Vehicle Lifts	Percent of vehicles and equipment that have either met or exceeded their useful life benchmark	< 20	< 30
		Facilities		
Support	Maintenance and Administrative Facilities	Percent of facilities within an asset class rated below 3 on condition reporting system	0	< 15
Passenger	Rail Terminals, Bus Transfer Stations	Percent of facilities within an asset class rated below 3 on condition reporting system	0	0
Parking	Park-Ride Lots with Direct Capital Responsibility	Percent of facilities within an asset class rated below 3 on condition reporting system	0	0
		Infrastructure		
Fixed Guideway	Track Segments, Exclusive Bus Rights-of-Way, Catenary Segments, and Bridges	Percent of segments that have performance restrictions	0	0

[a] *Short-term targets (2018 and beyond) for these performance measures will be based on the original year 2018 target until additional Federal and State funding becomes available for transit capital projects.*

Source: SEWRPC, 12/2023

for the remaining measures were set as 0 percent based on the assumption that investment levels needed to implement the VISION 2050 recommendations would be sufficient to achieve these targets. With respect to the short-term targets, more achievable targets were established for the year 2018 targets, as shown in Table 2, based on current State and Federal transit capital levels not being sufficient for achieving the long-term targets. Table 3 shows a comparison of the actual condition of the transit assets in the Region compared to the short-term target. While the target was met for buses and other passenger vehicle asset class, the targets were not met for the non-revenue service vehicles and support facilities asset classes.

Despite the challenges of operating transit systems during the COVID-19 pandemic, transit operators continue to maximize the use of all available transit capital funds to maintain a state of good repair. Until recently, Federal funding has been below the historical average and State transit funding has not kept pace with inflation. In addition, the State limits the ability of local governments to replace these limited Federal and State funds with local property taxes through tax levy caps and prohibits the implementation of new revenue sources. Combined, these factors create additional challenges for the Region's transit operators as they attempt to achieve and maintain a state of good repair. More permanent Federal support provided in the Infrastructure Investment and Jobs Act will allow transit operators to continue to improve transit services and meet or exceed TAM performance targets. Transit operators continue making progress toward achieving the targets established for transit assets in Southeastern Wisconsin by making maximum use of all available FTA funds to maintain a state of good repair for revenue vehicles, equipment, and facilities. As a result, the short-term TAM targets will remain unchanged for the establishment of the annual targets for years subsequent to 2018 at this time. Transit operators in Southeastern Wisconsin will continue to utilize every opportunity to maintain a state of good repair through ongoing preventative maintenance procedures and tracking regular inspections of transit assets. In addition, the transit operators will continue to utilize useful life benchmarks to prioritize critical needs, apply for transit capital funding as appropriate, and include their transit funding priorities within local Capital Improvement Programs and the regional TIP.

TRANSIT SAFETY TARGETS

The Public Transportation Agency Safety Plan (PTASP) regulation requires operators of public transportation systems that receive federal funds under FTA's Urbanized Area Formula Grants to develop safety plans that include the processes and procedures to implement Safety Management Systems. A safety performance target is a quantifiable level of performance or condition expressed as a value for the measure related to safety management activities to be achieved within a set time period. A safety performance measure is a quantifiable indicator of performance or condition that is used to establish targets related to safety management activities, and to assess progress toward meeting the established targets. FTA has developed regulations for the monitoring of transit safety for transit operators nationwide. Specifically, FTA established seven performance measures for target-setting purposes: 1) the total number of reportable fatalities, 2) the rate of reportable fatalities per total vehicle-revenue miles, 3) total number of reportable injuries, 4) the rate of reportable injuries per total vehicle-revenue miles, 5) the total number of reportable safety events (derailments, collisions, fires, and evacuations), 6) the rate of reportable events per total vehicle miles, and 7) the mean distance between major mechanical failures. Per the FTA regulations, the Commission established initial transit safety-related targets in 2021 following the development of transit safety plans by transit operators and WisDOT. Safety performance and targets are reviewed annually by transit providers and shared with Commission staff, as required in the PTASP regulation. Based on the five-year average transit safety performance and a review of operators' current transit safety targets, the targets will remain unchanged from those initially set in 2021. Table 4 shows the five-year average transit safety performance and the regional transit safety targets for 2023 and 2050. Regional transit safety targets are not required to be set each year but may be revisited during the development of subsequent updates to VISION 2050.

Table 3
Comparison of Actual 2021 Data to Short-Term Target for the Transit Asset Management Performance Measure

Asset Class	Asset Examples	Performance Measure	Short-Term Target	Year 2021 Data
		Rolling Stock		
Buses, Other Passenger Vehicles, and Railcars	Bus, Cutaway, Van, Minivan, and Streetcars	Percent of revenue vehicles that have either met or exceeded their useful life benchmark	< 30	6.1
		Equipment		
Non-Revenue Service Vehicles and Equipment Over $50,000	Route Supervisor Vehicles, Maintenance Trucks, Pool Vehicles, DPF Cleaning System, Bus Wash Systems, Fare Collection Systems, Vehicle Lifts	Percent of vehicles and equipment that have either met or exceeded their useful life benchmark	< 30	47.5
		Facilities		
Support	Maintenance and Administrative Facilities	Percent of facilities within an asset class rated below 3 on condition reporting system	< 15	50
Passenger	Rail Terminals, Bus Transfer Stations	Percent of facilities within an asset class rated below 3 on condition reporting system	0	0
Parking	Park-Ride Lots with Direct Capital Responsibility	Percent of facilities within an asset class rated below 3 on condition reporting system	0	0
		Infrastructure		
Fixed Guideway	Track Segments, Exclusive Bus Rights-of-Way, Catenary Segments, and Bridges	Percent of segments that have performance restrictions	0	0

[a] *Short-term targets (2018 and beyond) for these performance measures will be based on the original year 2018 target until additional Federal and State funding becomes available for transit capital projects.*

Source: National Transit Database and SEWRPC, 12/2023

Table 4
Regional Transit Safety Five-Year Average Performance and Targets

Five-Year Average Annual Regional Transit Safety Performance: 2017-2021							
Mode of Transit Service	**Number of Fatalities**	**Number of Fatalities per 1 Million VRM**	**Number of Injuries**	**Number of Injuries per 1 Million VRM**	**Number of Safety Events**	**Number of Safety Events per 1 Million VRM**	**Mean Distance Between Major Mechanical Failure (Miles)[b]**
Fixed Route	1.20	0.06	113.60	5.75	102.80	5.21	6,485
Fixed Route Rail[a]	0.00	0.00	3.00	37.78	5.20	76.90	7,218
Non-Fixed Route Rail	0.20	0.04	36.00	6.69	37.00	6.87	116,443

Regional Transit Safety Targets: Years 2023 and 2050							
Mode of Transit Service	**Number of Fatalities**	**Number of Fatalities per 1 Million VRM**	**Number of Injuries**	**Number of Injuries per 1 Million VRM**	**Number of Safety Events**	**Number of Safety Events per 1 Million VRM**	**Mean Distance Between Major Mechanical Failure (Miles)**
Fixed Route	0.50	0.00	107.60	5.30	92.50	4.60	11,258
Fixed Route Rail[a]	0.00	0.00	1.80	16.10	2.90	25.70	5,226
Non-Fixed Route Rail	0.00	0.00	40.10	6.90	41.00	7.00	110,033

Note: Performance categories are based on safety performance criteria established under the National Public Transportation Safety Plan pursuant 49 CFR Part 673, Public Transportation Agency Safety Plan.

[a] *The data and targets for fixed-route rail are based on the five-year average annual data for the City of Kenosha's streetcar plus one year of data for the City of Milwaukee's streetcar from 2019, the system's first full year of revenue service. The targets do not pertain to Metra commuter rail service because Metra is regulated by the Federal Railroad Administration (FRA).*

[b] *Rural or reduced reporters, including Western Kenosha County Transit, Walworth County, and the Cities of Hartford, West Bend, and Whitewater, are not required by the Federal Transit Administration to report data on major mechanical failures, and are therefore not included in the five-year annual average.*

Source: National Transit Database and SEWRPC, 12/2023

HIGHWAY SAFETY TARGETS

FHWA has developed five safety-related performance measures that are to be established annually for all public roadways: 1) the number of fatalities, 2) the rate of fatalities per one hundred million vehicle-miles traveled (HMVMT), 3) number of serious injuries, 4) the rate of serious injuries per HMVMT, and 5) the number of non-motorized fatalities and serious injuries.[3] The targets are set for each of the five performance measures as a rolling five-year average[4] ending the year after the reporting year. The methodology for calculating these measures is shown in Figure 2. The targets are compared to a base rolling five-year average ending in the year previous to the reporting year.

Table 5 shows the years 2046-2050 targets for each of the five safety performance measures for the Region, including the portions of Jefferson and Dodge Counties within the MPA. These targets were established based on an evaluation of short-term and long-term trends in the number of fatalities and serious injuries and consideration of the safety improvement recommendations of the State's 2017-2020 Strategic Highway Safety Plan (SHSP) and VISION 2050. Specifically, the targets were established based on a continuation of the overall trend of a long-term reduction of fatalities and serious injuries that has occurred over the last 20 to 40 years. However, following the establishment of the original long-term target, the Traffic Operations and Safety Laboratory (TOPS Lab) based at the University of Wisconsin-Madison began reporting the actual number of serious injuries resulting from vehicular crashes in the State from 1994 to the present. As a result, revised long-term (2046-2050) targets were established as part of the 2024 Review and Update of VISION 2050 for the serious-injury related performance measures, as shown in Table 6. These revised targets were developed based on the same methodology utilized to establish the original targets.

Figure 3 shows a comparison of the actual and target five-year averages from the baseline years of 2012-2016 through years 2046-2050 for the number and rate of fatalities, the number and rate of serious injuries, and the number of non-motorized fatalities and serious injuries. For purposes of the national performance management framework, Table 7 shows a comparison of the actual and target five-year 2017-2021 averages for both the MPA and the Region. As shown in these figures and table, none of the actual five-year averages met the established targets. In addition, the actual five-year results for all five performance measures exceed the baseline levels. The increases in the five-year averages for the performance measures are a result of continuous increases in the number of fatalities and serious injuries that occurred following the achievement of their all-time regional lows in 2013 and 2015, respectively. Specifically, the annual number of fatalities increased from 125 fatalities in 2013 to a peak of 198 in 2022 (a 17-year high) and the annual number of serious injuries increased from 794 in 2015 to a peak of 1,163 in 2021 (a 12-year high). These recent increases in fatalities and serious injuries have renewed efforts in implementing recommendations of statewide, regional, and local safety recommendations. Along with other efforts (such as improved vehicle technology), it is expected that the long-term decline in fatalities and serious injuries would resume, but perhaps not at the rate experienced in the past. However, while more aspirational than originally intended, the long-term targets were still considered valid for establishing short-term targets as part of implementing the national performance management framework. As such, Table 8, shows the updated annual short-term Region and MPA safety targets for the 2022-2025 performance period and the current 2023-2026 regional TIP, based on the long-term targets.

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[3] A non-motorized fatality or serious injury involves any vehicular crash that results in the death or serious injury of a pedestrian, bicyclist, or person utilizing a wheelchair (manual or motorized).

[4] Due to the somewhat random nature of crashes, the frequency of crashes from year-to-year can fluctuate, and it is possible that the number of crashes in one year may be lower or higher than a typical year. Thus, to avoid annual anomalies, the annual average of the number of crashes over a certain time period is commonly used (such as three or five years).

Figure 2
Methodology for Calculating the Highway Safety Performance Measures

The following is the methodology developed by FHWA for calculating the following five highway safety performance measures:

- Number of Fatalities
- Number of Serious Injuries
- Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries
- Rate of Fatalities per 100 Million Vehicle-Miles Traveled (HMVMT)
- Rate of Serious Injuries per HMVMT

1. Assemble fatality, serious injury, and vehicle-miles traveled (VMT) data for all public roadways over a five-year period from the following sources:

Data	Source
Fatalities	National Highway Transportation Safety Association (NHTSA) Fatality Analysis Reporting System (FARS)
Serious Injuries	State DOT-supplied Data Source
VMT	MPO-Documented VMT Methodology

2. Calculate the five-year average for each performance measure, based on the following formula:

$$Number\ of\ Fatalities = \frac{\sum(Number\ of\ Fatalities)_{Years\ 1-5}}{5\ Years}$$

$$Number\ of\ Serious\ Injuries = \frac{\sum(Number\ of\ Serious\ Injuries)_{Years\ 1-5}}{5\ Years}$$

$$Number\ of\ Non\text{-}Motorized\ Fatalities\ and\ Serious\ Injuries = \frac{\sum\left(_{Fatalities\ and\ Serious\ Injuries}^{Number\ of\ Non\text{-}Motorized}\right)_{Years\ 1-5}}{5\ Years}$$

$$Rate\ of\ Fatalities\ Per\ HMVMT = \frac{\sum\left(\frac{Number\ of\ Fatalities\ \mathrm{x}\ 100{,}000{,}000}{Annual\ VMT}\right)_{Years\ 1-5}}{5\ Years}$$

$$Rate\ of\ Serious\ Injuries\ Per\ HMVMT = \frac{\sum\left(\frac{Number\ of\ Serious\ Injuries\ \mathrm{x}\ 100{,}000{,}000}{Annual\ VMT}\right)_{Years\ 1-5}}{5\ Years}$$

Source: Federal Highway Administration and SEWRPC, 12/2023

Table 5
Years 2046-2050 Regional Targets for National Safety-Related Performance Measures

Performance Measure	2012-2016 Baseline Data	2046-2050 Target	Percent Change from 2012-2016 Base Year
Number of Fatalities	152.2	91.9	-39.6
Rate of Fatalities	0.962	0.488	-49.3
Number of Serious Injuries	798.2	144.1	-82.0
Rate of Serious Injuries	5.053	0.766	-84.8
Number of Non-Motorized Fatalities and Serious Injuries	167.2	45.7	-72.7

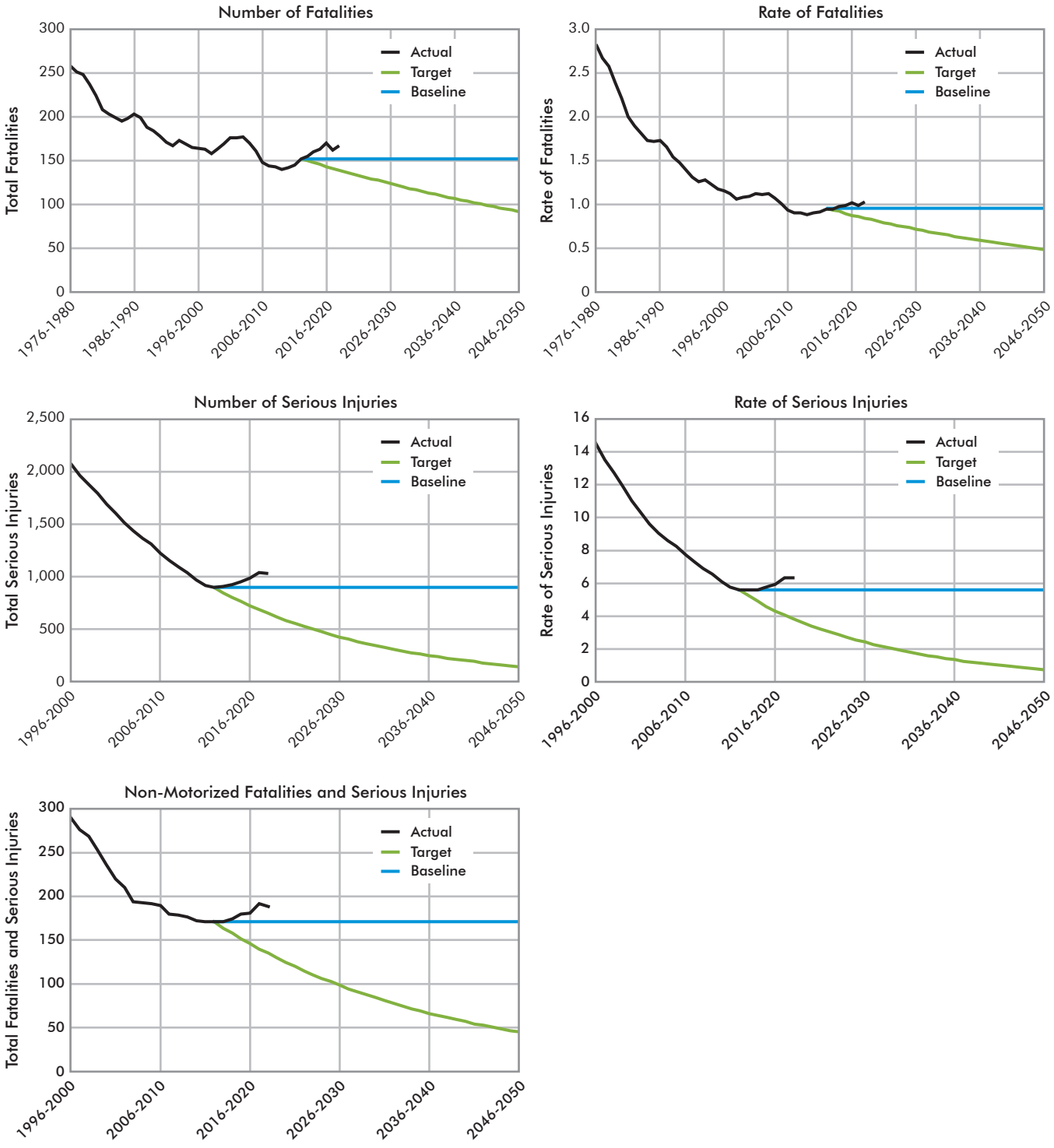
Source: Fatality Analysis Reporting System (FARS), Wisconsin Traffic Operations and Safety Laboratory, and SEWRPC; 12/2023

Table 6
Revised Years 2046-2050 Regional Targets for Serious Injury-Related Performance Measure

Performance Measure	2012-2016 Baseline Data	2046-2050 Target	Percent Change from 2012-2016 Base Year
Number of Serious Injuries	896.8	147.0	-83.6
Rate of Serious Injuries	5.627	0.767	-86.4
Number of Non-Motorized Fatalities and Serious Injuries	170.8	45.0	-73.6

Source: Fatality Analysis Reporting System (FARS), Wisconsin Traffic Operations and Safety Laboratory, and SEWRPC; 12/2023

Figure 3
Comparison of Actual and Target Five-Year Averages for the National Highway Safety Performance Measures



Source: Fatality Analysis Reporting System (FARS), Wisconsin Traffic Operations and Safety Laboratory, and SEWRPC; 12/2023

Table 7
Years 2014-2018 Actual Data and Targets for the National Safety-Related Performance Measures for the Metropolitan Planning Area and Seven-County Region

Metropolitan Planning Area

Performance Measure	2012-2016 Baseline Data	2017-2021 Target	2017-2021 Actual	Progress Made in Achieving Target
Number of Fatalities	137.2	127.4	150.0	No
Fatality Rate	0.923	0.827	0.971	No
Number of Serious Injuries	834.6	648.8	866.4	No
Serious Injury Rate	5.579	4.178	6.385	No
Number of Non-Motorized Fatalities and Serious Injuries	164.4	135.9	186.8	No

Seven-County Region

Performance Measure	2012-2016 Baseline Data	2017-2021 Target	2017-2021 Actual	Progress Made in Achieving Target
Number of Fatalities	152.2	162.4	141.3	No
Fatality Rate	0.962	0.861	0.985	No
Number of Serious Injuries	896.8	687.4	1,030.6	No
Serious Injury Rate	5.627	4.086	6.342	No
Number of Non-Motorized Fatalities and Serious Injuries	170.8	138.2	191.8	No

Note: Progress is made in achieving target by either meeting target outright or by improving upon baseline data.

Source: Fatality Analysis Reporting System (FARS), Wisconsin Traffic Operations and Safety Laboratory, and SEWRPC; 12/2023

Table 8
Resulting Years 2018-2022 through 2022-2026 Targets for the National Safety-Related Performance Measures for the MPA and Region Based on the Years 2046-2050 Regional Targets

Metropolitan Planning Area

Performance Measure	2016-2020 Baseline Data	2018-2022 Target	2019-2023 Target	2020-2024 Target	2021-2025 Target	2022-2026 Target
Number of Fatalities	154.8	125.5	123.7	121.8	120.0	118.3
Fatality Rate	0.994	0.811	0.796	0.781	0.766	0.750
Number of Serious Injuries	933.6	617.0	586.7	557.9	530.5	504.4
Serious Injury Rate	5.986	3.932	3.725	3.530	3.346	3.168
Number of Non-Motorized Fatalities and Serious Injuries	175.2	130.8	125.9	121.2	116.6	112.3

Seven-County Region

Performance Measure	2016-2020 Baseline Data	2018-2022 Target	2019-2023 Target	2020-2024 Target	2021-2025 Target	2022-2026 Target
Number of Fatalities	170.0	139.2	137.2	135.2	133.2	131.2
Fatality Rate	1.024	0.844	0.828	0.812	0.796	0.779
Number of Serious Injuries	990.6	651.8	618.0	586.0	555.7	526.9
Serious Injury Rate	5.958	4.333	4.086	3.854	3.636	3.433
Number of Non-Motorized Fatalities and Serious Injuries	181.2	135.0	129.8	124.8	120.0	115.4

Source: Fatality Analysis Reporting System (FARS), Wisconsin Traffic Operations and Safety Laboratory, and SEWRPC; 12/2023

NHS PAVEMENT CONDITION TARGETS

As part of the national performance management framework, FHWA developed four performance measures to monitor pavement condition: 1) percentage of the Interstate system in good condition, 2) percentage of the Interstate system in poor condition, 3) percentage of the non-Interstate NHS in good condition, and 4) percentage of the non-Interstate NHS in poor condition. The methodology for calculating each of the four pavement condition performance measures is provided in Figure 4. The data utilized to develop the performance measures are based on data submitted annually by WisDOT to FHWA through its Highway Performance Monitoring System (HPMS). Based on the methodology developed by FHWA, a rating of good, fair, or poor is determined based on the criteria established for various types of pavement. Then, the performance measures are calculated by dividing the lane-miles of good or poor pavement by the total lane-miles of evaluated pavement for both the Interstate system and the non-Interstate NHS.

Table 9 shows the year 2050 pavement targets for the Interstate system and the non-Interstate NHS in the Region. These targets were established based on an evaluation of recent trends in the pavement condition on the Region's arterial roadways and the recommendation in VISION 2050 related to maintaining or improving the condition of Region's arterial roadways. Specifically, the targets for the NHS pavement performance measures were established based on the amount of existing lane-miles in good condition increasing by 10 percent and the amount of lane-miles in poor condition decreasing by 10 percent between 2017 (the base year of the data) and the design year 2050.

Figure 5 shows a comparison of the actual and target from the 2017 baseline year through 2050 for the percentage of lane-miles in good and poor condition for both the Interstate and non-Interstate NHS. For purposes of the national performance management framework, Table 10 shows a comparison between the year 2021 actual data and the established targets for the MPA and the Region. There was progress made in the achievement of all the year 2021 targets related to poor condition of the Interstate and non-Interstate NHS in both the Region and NHS. However, only the Interstate NHS in the MPA showed progress being achieved for the year 2021 targets related to good condition. Map 2 shows the comparison of the actual year 2017 and year 2021 pavement condition for both the Interstate and non-Interstate NHS. With respect to the Interstate highway system, much of the improvement in condition from 2017 and 2021 appears to be attributed to a diamond-grinding project along IH 43 between STH 32 and the northern Ozaukee County line. With respect to the non-Interstate NHS, it appears that the improvement of the percentage of poor pavement could be attributed to a number of projects occurring throughout the Region over that time period. Given that the condition of pavement appears to improve between 2021 and 2022, as shown in Figure 5, along with the expected implementation of projects with the increased Federal transportation funds from the Bipartisan Infrastructure Law (BIL), enacted in 2021, it appears that the current long-term trends remain valid. As such, Table 11, shows the updated four-year (2025) targets for the Region and MPA NHS condition targets for the 2022-2025 performance period and the current 2023-2026 regional TIP.

NHS BRIDGE CONDITION TARGETS

FHWA developed two performance measures to monitor bridge condition: 1) percentage of NHS bridges in good condition and 2) percentage of NHS bridges in poor condition. The methodology for calculating the two bridge condition performance measures is provided in Figure 6. A rating of good, fair, or poor is determined based on the criteria established by FHWA for bridges and culverts. Then, the performance measures are calculated by dividing the total deck area of good or poor bridges by the total deck area of evaluated pavement for both the Interstate system and the non-Interstate NHS.

Table 12 shows the established year 2050 bridge targets for the NHS in the Region. These targets were established based on an evaluation of recent trends in bridge condition on the Region's arterial roadways and the recommendation in VISION 2050 related to maintaining or improving the condition of the Region's bridges on the arterial roadway system. Specifically, the targets for the NHS bridge performance measures were established based on the amount of existing bridge deck in good condition increasing by 10 percent and the amount of deck area in poor condition decreasing by 10 percent between 2017 (the base year of the data) and 2050 (the design year). Following the establishment of

Figure 4
Methodology for Calculating the National Pavement Performance Measures for the Interstate System and the Non-Interstate National Highway System (NHS)

The following is the methodology developed by FHWA for calculating the four pavement-related performance measures:

- Percent of Lane-Miles of Interstate Highway System with Good Pavement Condition
- Percent of Lane-Miles of Interstate Highway System with Poor Pavement Condition
- Percent of Lane-Miles of Non-Interstate NHS with Good Pavement Condition
- Percent of Lane-Miles of Non-Interstate NHS with Poor Pavement Condition

1. The following four criteria from data submitted by the State to the Highway Performance Management System (HPMS) are utilized for asphalt and concrete pavement, as follows:

Pavement Type	International Roughness Index (IRI)	Percent Cracking	Average Rutting	Average Faulting
Asphaltic Pavement (AP)	X	X	X	
Jointed Concrete Pavement (JCP)	X	X		X
Continuous Reinforced Concrete Pavement (CRCP)	X	X		

2. For every segment of the Interstate system or the Non-Interstate NHS having pavement condition data in the HPMS, identify the Good and Poor condition for each of the relevant criteria based on the following thresholds:

Measure Criteria	Good	Fair	Poor
IRI	<95	95-170	>170
Percent Cracking	<5	AP: 5-20 JCP: 5-15 CRCP: 5-10	AP: >20 JCP: >15 CRCP: >10
Average Rutting (Inches)	<0.20	0.20-0.40	>0.40
Average Faulting (Inches)	<0.10	0.10-0.15	>0.15

3. Determine the overall Good or Poor pavement condition for every segment of Interstate system or the Non-Interstate NHS, based on the following:

Good	AP and JCP: All Three Criteria Good CRCP: Both Criteria Good
Poor	AP and JCP: Two Criteria Poor CRCP: Both Criteria Poor
Fair	All Other Conditions

4. Calculate the respective performance measure by the following formula:

$$\textit{Percent of Interstate or Non-Interstate NHS Having Good or Poor Pavement} = \frac{\textit{Lane-Miles of Good or Poor Pavement}}{\textit{Total Lane Miles}}$$

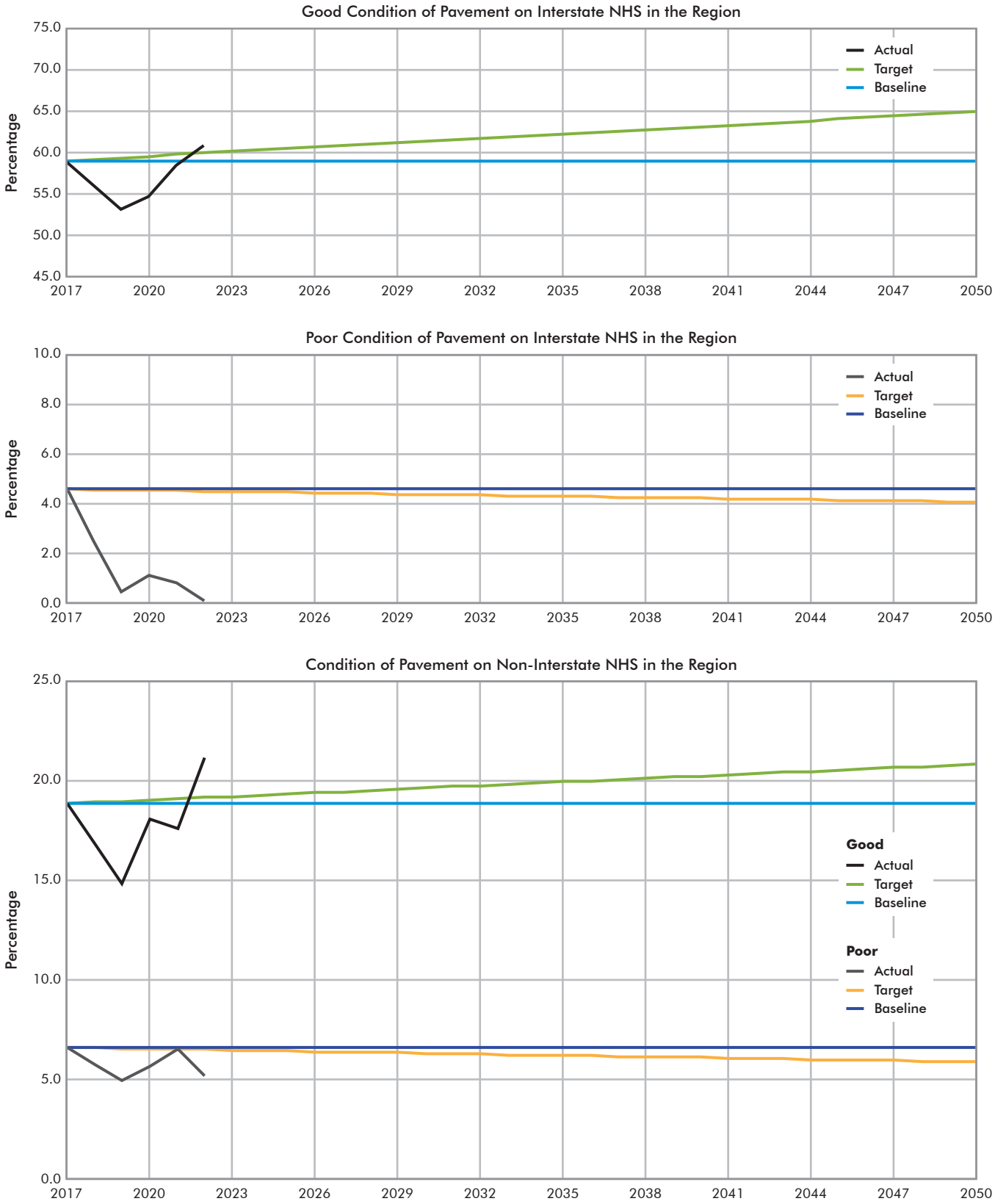
Source: Federal Highway Administration and SEWRPC, 12/2023

Table 9
Year 2050 Regional Targets for the National Highway System (NHS) Pavement Performance Measures

Performance Measure	Year 2017 Regional Baseline Data	Year 2050 Regional Target	Percent Change from 2017 Base Year
Interstate NHS Pavement Condition			
Percentage of Lane-Miles in Good Condition	59.0	≥ 64.9	+10.0
Percentage of Lane-Miles in Poor Condition	4.6	≤ 4.1	-10.0
Non-Interstate NHS Pavement Condition			
Percentage of Lane-Miles in Good Condition	18.9	≥ 20.8	+10.0
Percentage of Lane-Miles in Poor Condition	6.6	≤ 5.9	-10.0

Source: WisDOT and SEWRPC, 12/2023

Figure 5
Comparison of Actual Data and Targets for the National Highway System Pavement Performance Measures



Source: SEWRPC, 12/2023

Table 10
Year 2021 Actual Data and Targets for the National Highway System Pavement Performance Measures for the Metropolitan Planning Area and Seven-County Region

	Metropolitan Planning Area				Seven-County Region			
Performance Measure	Year 2017 Baseline Data	Year 2021 Established Target	Year 2021 Actual Data	Progress Made in Achieving Target	Year 2017 Baseline Data	Year 2021 Established Target	Year 2021 Actual Data	Progress Made in Achieving Target
Interstate NHS Pavement Condition								
Percent of Lane-Miles in Good Condition	61.1	≥ 61.8	58.7	No	59.0	≥ 59.7	58.5	No
Percent of Lane-Miles in Poor Condition	4.4	≤ 4.3	0.2	Yes	4.6	≤ 4.5	0.8	Yes
Non-Interstate NHS Pavement Condition								
Percent of Lane-Miles in Good Condition	17.6	≥ 17.8	17.9	Yes	18.9	≥ 19.1	17.6	No
Percent of Lane-Miles in Poor Condition	6.8	≤ 6.7	6.6	Yes	6.6	≤ 6.5	6.6	Yes

Note: Progress is made in achieving target by either meeting target outright or by improving upon baseline data.

Source: WisDOT and SEWRPC, 12/2023

Map 2
Pavement Conditions in Southeastern Wisconsin: Years 2017 and 2021

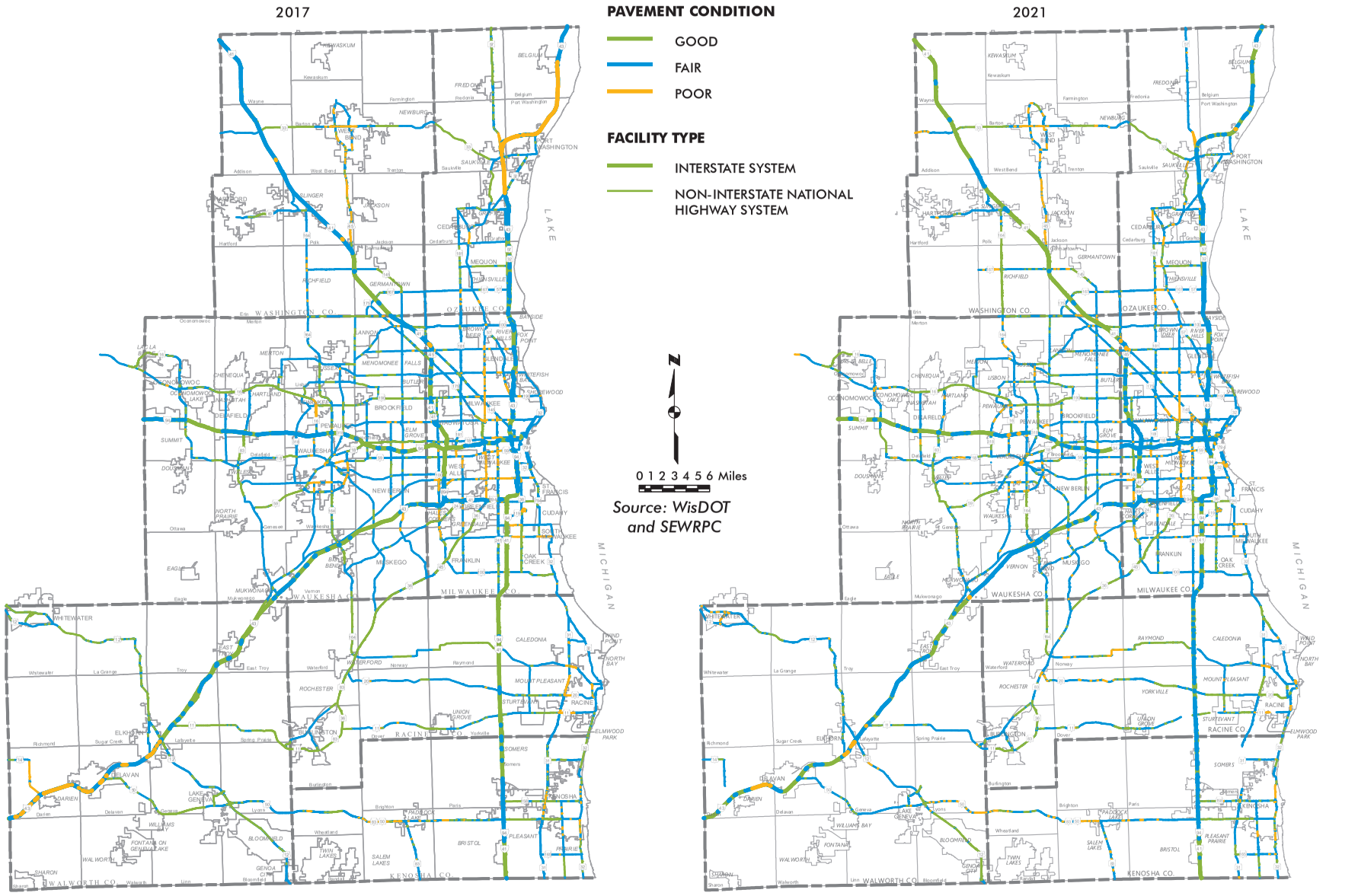


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Table 11
Resulting Year 2025 Targets for the NHS Pavement Performance Measures for the MPA and Region Based on the Year 2050 Regional Targets

Performance Measure	Metropolitan Planning Area		Seven-County Region	
	Year 2021 Baseline Data	Year 2025 Target	Year 2021 Baseline Data	Year 2025 Target
Interstate NHS Pavement Condition				
Percentage of Lane-Miles in Good Condition	58.7	≥ 62.6	58.5	≥ 60.4
Percentage of Lane-Miles in Poor Condition	0.2	≤ 4.3	0.8	≤ 4.5
Non-Interstate NHS Pavement Condition				
Percentage of Lane-Miles in Good Condition	17.9	≥ 18.0	17.6	≥ 19.3
Percentage of Lane-Miles in Poor Condition	6.6	≤ 6.6	6.6	≤ 6.4

Source: WisDOT and SEWRPC, 12/2023

Figure 6
Methodology for Calculating the National Bridge Performance Measures for the National Highway System (NHS)

The following is the methodology developed by FHWA for calculating the two bridge-related performance measures:

- Percent of Deck Area of NHS Bridges in Good Condition
- Percent of Deck Area of NHS Bridges in Poor Condition

1. Identify the Good and Poor condition for each of the relevant criteria based on the following thresholds for the ratings as reported to the National Bridge Inventory:

Measure Criteria	Good	Fair	Poor
Deck	≥7	5 or 6	≤4
Superstructure	≥7	5 or 6	≤4
Substation	≥7	5 or 6	≤4
Culvert	≥7	5 or 6	≤4

2. Calculate overall bridge condition based on the lowest condition of the three criteria for bridges—Deck, Superstructure, and Substation—and the Culvert criteria for culverts.

3. Calculate the respective performance measure by the following formula:

$$\begin{matrix}Percent\ of\ NHS\ Bridges \\ Having\ Good\ or\ Poor\ Pavement\end{matrix} = \frac{Deck\ Area\ \ of\ Good\ or\ Poor\ Pavement}{Total\ Deck\ Area}$$

Source: Federal Highway Administration and SEWRPC, 12/2023

Table 12
Year 2050 Regional Targets for National Highway System (NHS) Bridge Performance Measures

Performance Measure	Year 2017 Regional Baseline Data	Year 2050 Regional Target	Percent Change from 2017 Base Year
Percentage of NHS Bridge Deck Area in Good Condition	58.0	≥ 63.8	+10.0
Percentage of NHS Bridge Deck Area in Poor Condition	1.3	≤ 1.2	-10.0

Source: WisDOT and SEWRPC, 12/2023

the NHS bridge condition targets, it was discovered that the 2017 and 2018 databases did not yet identify about 250 bridges that were located on roadways added to the NHS by MAP-21. As a result, the year 2050 NHS bridge targets were revised as part of the 2024 Review and Update of VISION 2050 based on the revised base year 2017 bridge conditions, as shown in Table 13. The revised targets were established based on the same methodology that was used to establish the original targets.

Figure 7 shows a comparison of the actual and target from the 2017 baseline year through 2050 for the percentage of lane-miles in good and poor condition for the NHS bridge condition. For purposes of the national performance management framework, Table 14 compares the year 2021 actual and target NHS bridge conditions for the MPA and Region. No progress was made in the short term in achieving any of the NHS bridge condition targets. Map 3 compares the condition of bridges along the NHS between the years 2017 and 2021. The condition of the bridges along IH 94 in Racine and Kenosha Counties was improved as part of the freeway reconstruction project. However, with the exception of a few other bridges rehabilitated or replaced, there was a general decline in the condition of the bridges in the Region throughout this time period. As the freeway reconstruction project along IH 43 between Silver Spring Drive and STH 60 is completed in 2025, along with the increased funding for NHS and bridge projects in the BIL legislation, it is expected that the condition of the NHS will improve over the next two to four years. Therefore, it appears that the long-term NHS bridge targets remain valid. As such, Table 15, shows the updated four-year (2025) targets for the Region and MPA NHS bridge condition targets for the 2022-2025 performance period and the current 2023-2026 regional TIP.

NHS SYSTEM RELIABILITY AND FREIGHT RELIABILITY TARGETS

As part of the national performance management framework, FHWA developed three reliability-based performance measures:[5] 1) percent of the Interstate system that is reliable, 2) percent of the non-Interstate NHS that is reliable, and 3) freight reliability ratio. Figures 8 and 9 show the methodology that is to be utilized to calculate the three performance measures. The travel time data that are to be used to calculate these performance measures come from a data set provided by FHWA, called the National Performance Management Research Data Set (NPMRDS). This data set is developed based on probe data that are collected from a third-party and geo-referenced to segments of the NHS. For the year 2017, NPMRDS data are available for nearly the entire Interstate System in Southeastern Wisconsin but are only available for about 80 percent of the non-Interstate NHS. Since 2017, the quality and quantity of NPMRDS data have improved and the data are available for nearly the entire Interstate and non-Interstate NHS.

Table 16 shows the year 2050 targets for the three reliability-based targets. These targets were established based on an evaluation of recent trends and the recommendations of VISION 2050 expected to assist in improving the reliability of the NHS, such as the planned improvement and expansion of transit, expansion of bicycle/pedestrian facilities, expansion of transportation systems and demand management measures, widening of existing arterials, and construction of new arterials. Specifically, the year 2050 regional reliability targets are based on a modest 5 percent improvement over the short-term average. For the two NHS performance measures, this would result in an improvement over the year 2017 levels. With respect to the freight measure, the target would result in a decline from 2017 levels. However, this was considered reasonable given how much lower the 2017 level of reliability was compared to the short-term average. In addition, the resulting short-term year 2021 targets for the MPA and Region were initially the same, as shown in Table 16.

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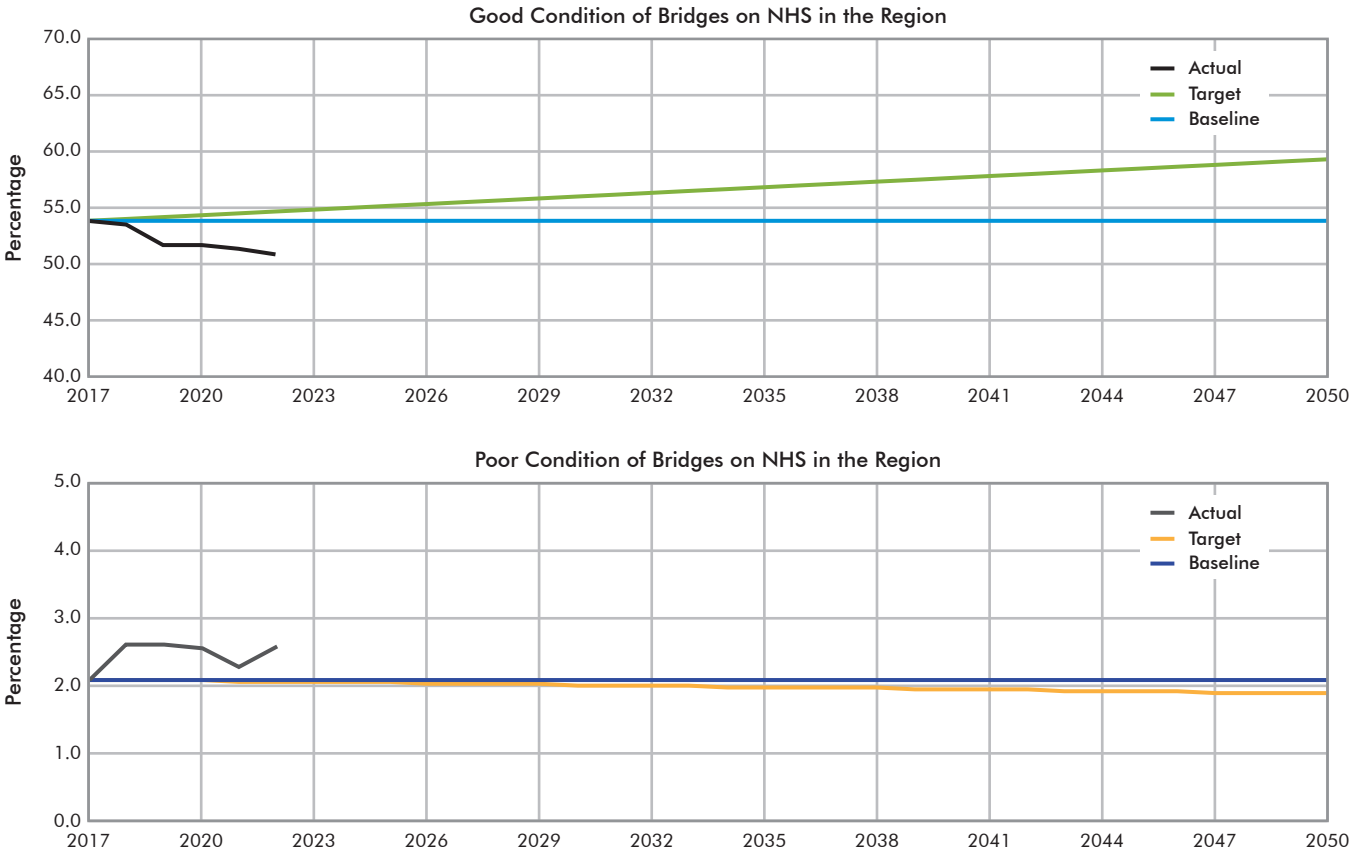
[5] Transportation system reliability reflects the degree to which travelers are able to reach their destinations on time. Travelers using a less reliable transportation system would be more likely to experience unexpected delays that can result in negative impacts, such as increased total travel time delay for personal vehicles and public transit, increased vehicle emissions, increased energy use, and increased freight shipping travel time and costs. Improving the ability of travelers to reach their destinations on time depends on a variety of factors, including: 1) reducing overall congestion; 2) reducing the frequency of vehicular crashes on arterial streets and highways, which can cause non-recurring congestion; 3) improving alternative routes and modes that can provide an opportunity for travelers to avoid congestion; and 4) expanding transportation options (such as commuter rail, light rail, and bus rapid transit) that are less impacted by inclement weather and crashes.

Table 13
Revised Year 2050 Regional Targets for the National Highway System (NHS) Bridge Performance Measures

Performance Measure	Year 2017 Regional Baseline Data	Revised Year 2050 Regional Target	Percent Change from 2017 Base Year
Percentage of NHS Bridge Deck Area in Good Condition	54.0	≥ 59.4	+10.0
Percentage of NHS Bridge Deck Area in Poor Condition	2.1	≤ 1.9	-10.0

Source: WisDOT and SEWRPC,12/2023

Figure 7
Comparison of Actual Data and Targets for the National Highway System Bridge Performance Measures



Source: SEWRPC, 12/2023

Table 14
Year 2021 Actual Data and Targets for the National Highway System (NHS) Bridge Performance Measures for the Metropolitan Planning Area and Seven-County Region

Performance Measure	Metropolitan Planning Area				Seven-County Region			
	Year 2017 Baseline Data	Year 2021 Established Target	Year 2021 Actual Data	Progress Made in Achieving Target	Year 2017 Baseline Data	Year 2021 Established Target	Year 2021 Actual Data	Progress Made in Achieving Target
Percentage of NHS Bridge Deck Area in Good Condition	53.9	≥ 54.6	52.7	No	54.0	≥ 54.6	51.4	No
Percentage of NHS Bridge Deck Area in Poor Condition	2.2	≤ 2.1	2.4	No	2.1	≤ 2.1	2.3	No

Note: Progress is made in achieving target by either meeting target outright or by improving upon baseline data.

Source: WisDOT and SEWRPC, 12/2023

Map 3
Bridge Conditions in Southeastern Wisconsin: Years 2017 and 2021

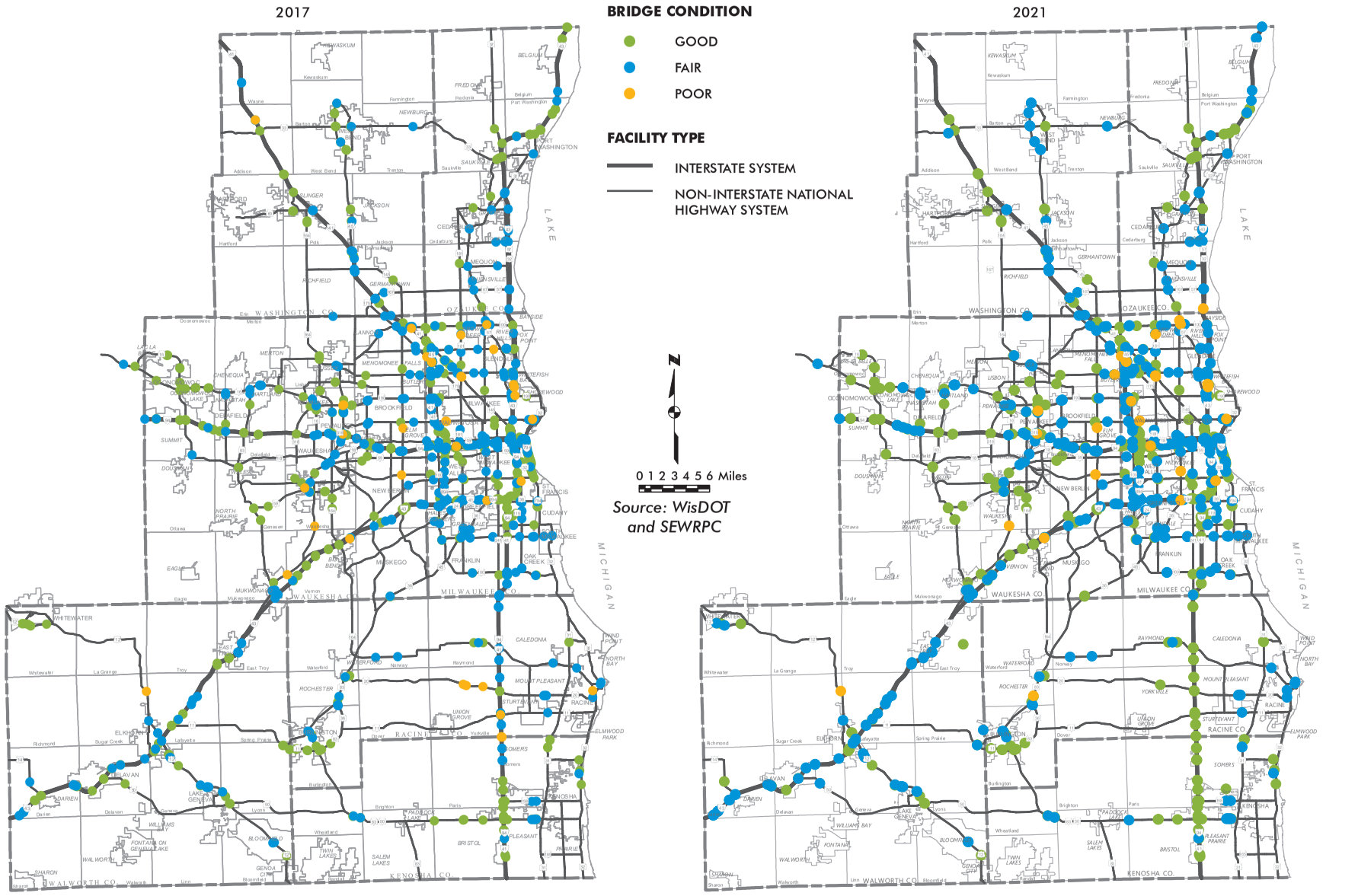


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Table 15
Resulting Year 2025 Targets for Bridge Condition of National Highway System (NHS) Performance Measures for the Metropolitan Planning Area and Seven-County Region

Performance Measure	Metropolitan Planning Area		Seven-County Region	
	Year 2021 Baseline Data	Year 2025 Target	Year 2021 Baseline Data	Year 2025 Target
Percentage of NHS Bridge Deck Area in Good Condition	52.7	≥ 55.3	51.4	≥ 55.3
Percentage of NHS Bridge Deck Area in Poor Condition	2.4	≤ 2.0	2.3	≤ 2.1

Source: WisDOT and SEWRPC, 12/2023

Figure 8
Methodology for Calculating the Travel Time Reliability Performance Measures for the Interstate System and the Non-Interstate National Highway System (NHS)

The following is the methodology developed by FHWA for calculating the two NHS reliability performance measures:

- Percent of Person-Miles on Interstate System that is Reliable
- Percent of Person-Miles on Non-Interstate NHS that is Reliable

1. Utilizing travel time data from the National Performance Management Research Data Set (NPMRDS), calculate the 80th percentile and the 50th percentile highest travel time for every segment of the Interstate system or the Non-Interstate NHS for each of the following four time periods from January 1st through December 31st of a given year:

   a. 6 a.m. – 10 a.m. (Monday through Friday)
   b. 10 a.m. – 4 p.m. (Monday through Friday)
   c. 4 p.m. – 8 p.m. (Monday through Friday)
   d. 6 a.m. – 8 p.m. (Saturday and Sunday)

2. For each time period, calculate the level of travel time reliability (LOTTR) for every reporting segment of Interstate system or Non-Interstate NHS for by the following formula:

$$Segment\ Level\ of\ Travel\ Time\ Reliability = \frac{80th\ Percentile\ Travel Time\ of\ Segment}{50th\ Percentile\ Travel Time\ of\ Segment}$$

3. Identify as reliable any reporting segment of the Interstate system or the Non-Interstate NHS that has an LOTTR of below a threshold of 1.50 for all four time periods.

4. Calculate for each reporting segment of the Interstate system or Non-Interstate NHS the annual person-miles of travel (APMT) based on the Annual Average Daily Traffic (AADT) volumes provided by the State for the national Highway Performance Monitoring System (HPMS) by the following formula:

$$Segment\ APMT = Segment\ Length \times AADT \times Directional\ Factor \times Occupancy\ Factor$$

   With the directional factor based on data provided to the HPMS and the occupancy factor provided by the State or MPO.

5. Calculate each of the performance measures by the following formula:

$$Percent\ of\ System\ APMT\ that\ is\ Reliable = 100 \times \frac{Total\ APMT\ of\ Reliable\ Segments}{Total\ System\ APMT}$$

Source: Federal Highway Administration and SEWRPC, 12/2023

Figure 9
Methodology for Calculating the Freight Travel Time Reliability Performance Measure for the Interstate System

The following is the methodology developed by FHWA for calculating the Freight reliability performance measure—the Freight reliability ratio.

1. Utilizing travel time data from the National Performance Management Research Data Set (NPMRDS), calculate the 95th percentile and the 50th percentile highest truck travel time for every reporting segment of the Interstate system for each of the following five time periods from January 1st through December 31st of a given year:

   a. 6 a.m. – 10 a.m. (Monday through Friday)
   b. 10 a.m. – 4 p.m. (Monday through Friday)
   c. 4 p.m. – 8 p.m. (Monday through Friday)
   d. 6 a.m. – 8 p.m. (Saturday and Sunday)
   e. 8 p.m. – 6 a.m. (Monday through Sunday)

2. For each time period, compute the truck travel time reliability (TTTR) for each reporting segment by the following formula:

$$TTTR = \frac{95th\ Percentile\ Travel\ Time\ of\ Reporting\ Segment}{50th\ Percentile\ Travel\ Time\ of\ Reporting\ Segment}$$

3. Identify for each reporting segment the maximum TTTR of all of the five time periods.

4. Calculate each of the performance measures for the reporting segments by the following formula:

$$Freight\ Reliability\ Ratio = \frac{\sum(Segment\ Length \times Segment\ maxTTTR)}{Total\ System\ Length}$$

Source: Federal Highway Administration and SEWRPC, 12/2023

Table 16
Year 2050 and Resulting Year 2021 Regional Targets for National Highway System (NHS) and Freight Reliability Performance Measures

Performance Measure	Year 2017 Baseline Data		Year 2050 Targets[a]	Year 2021 Targets[a]
	Metropolitan Planning Area	Seven-County Region		
Travel Time Reliability				
Percent of Person-Miles Traveled on the Interstate NHS that are Reliable	83.9	84.5	≥ 85.5	≥ 81.9
Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	90.9	90.8	≥ 95.2	≥ 91.2
Freight Reliability				
Freight Reliability Index	1.54	1.49	≤ 1.64	≤ 1.72

[a] *The year 2050 targets were established based on a five percent improvement to the average of past available reliability data from the MPA, rather than to the base year data as was done with the other performance targets. Since past reliability data was not available for the Region, the established reliability targets were considered the same for both the Metropolitan Planning Area and the Region.*

Source: WisDOT, Inrix, Inc., and SEWRPC; 12/2023

Figure 10 shows a comparison of the actual and target from the 2017 baseline year through 2050 for the three reliability measures. Interstate NHS and freight reliability greatly improved in 2020 due to the reduced use of the Interstate system resulting from the COVID-19 pandemic that year. However, both Interstate NHS and freight reliability measures worsened in 2021. Non-Interstate NHS reliability, in general, fluctuated between a low of 88.2 percent in 2018 and high of 91.2 percent in 2020. For purposes of the national performance management framework, Table 17 compares the year 2021 actual and target reliability measures for the MPA and Region. As expected, progress was made for all the Interstate NHS and freight reliability targets, but progress was not made on the non-Interstate NHS reliability with the actual reliability levels falling just below the baseline levels. Maps 4 and 5 compare the NHS and freight reliability, respectively, between the years 2017 and 2021. With respect to the Interstate NHS, there was some improvement to reliability in the IH 94 corridor between the Zoo and Marquette Interchanges, likely because of the COVID-19 pandemic having the effect of dampening traffic in that corridor in 2020 and 2021. It is likely that the reliability will worsen along this segment of freeway, and other segments, as the pre-pandemic levels of traffic have been restoring since 2021. A comparison of the maps also shows the worsening of reliability along IH 41 north of the Zoo Interchange, which likely occurred as a result of the freeway reconstruction project at that location. This project was completed in 2023 and will not have an effect on reliability in future years.

Given that the use of these performance measures is relatively new, and with progress being made or nearly made in achieving the short-term targets, it appears that the long-term NHS and freight reliability targets remain valid. As such, Table 18 shows the updated four-year (2025) targets for the Region and MPA NHS and freight reliability targets for the 2022-2025 performance period and the current 2023-2026 regional TIP. The Commission staff will continue to study the effect certain measures have on system reliability within the Region for consideration when these targets are reviewed and potentially improved as part of the preparation of the next update to VISION 2050.

CONGESTION MITIGATION AND AIR QUALITY

As part of the national performance management framework, FHWA developed three CMAQ-related performance measures:[6] 1) annual peak hour excessive delay per capita (PHED) measure, 2) the percent of travel occurring via non-single occupancy vehicles (non-SOV) measure, and 3) the on-road mobile source (i.e., vehicle) emissions measure. Per Federal regulations, applicability of these measures is dependent upon whether the geographic areas subject to the performance measures contained a nonattainment area or maintenance area under the 2008 ozone standard and the 2016 fine particulate standards on October 1, 2017. For the two capacity-related measures (the PHED and non-SOV measures), the geographic area is only for large urbanized areas (having a population over 1 million). For the emissions-based measure, the geographic area is the MPA. As shown on Map 6, both the Milwaukee urbanized area and the MPA contain 2008 ozone or 2016 fine particulate nonattainment and maintenance areas. Thus, targets for all three CMAQ-related performance measures are required to be established for Southeastern Wisconsin—PHED and non-SOV targets for the Milwaukee urbanized area and emission reduction targets for the MPA.

Per Federal regulations, WisDOT and the Commission are required to jointly establish identical targets for the two congestion-related performance measures. With respect to the emission reduction-related measure, WisDOT establishes a target for the State and the Commission establishes a target for the MPA.

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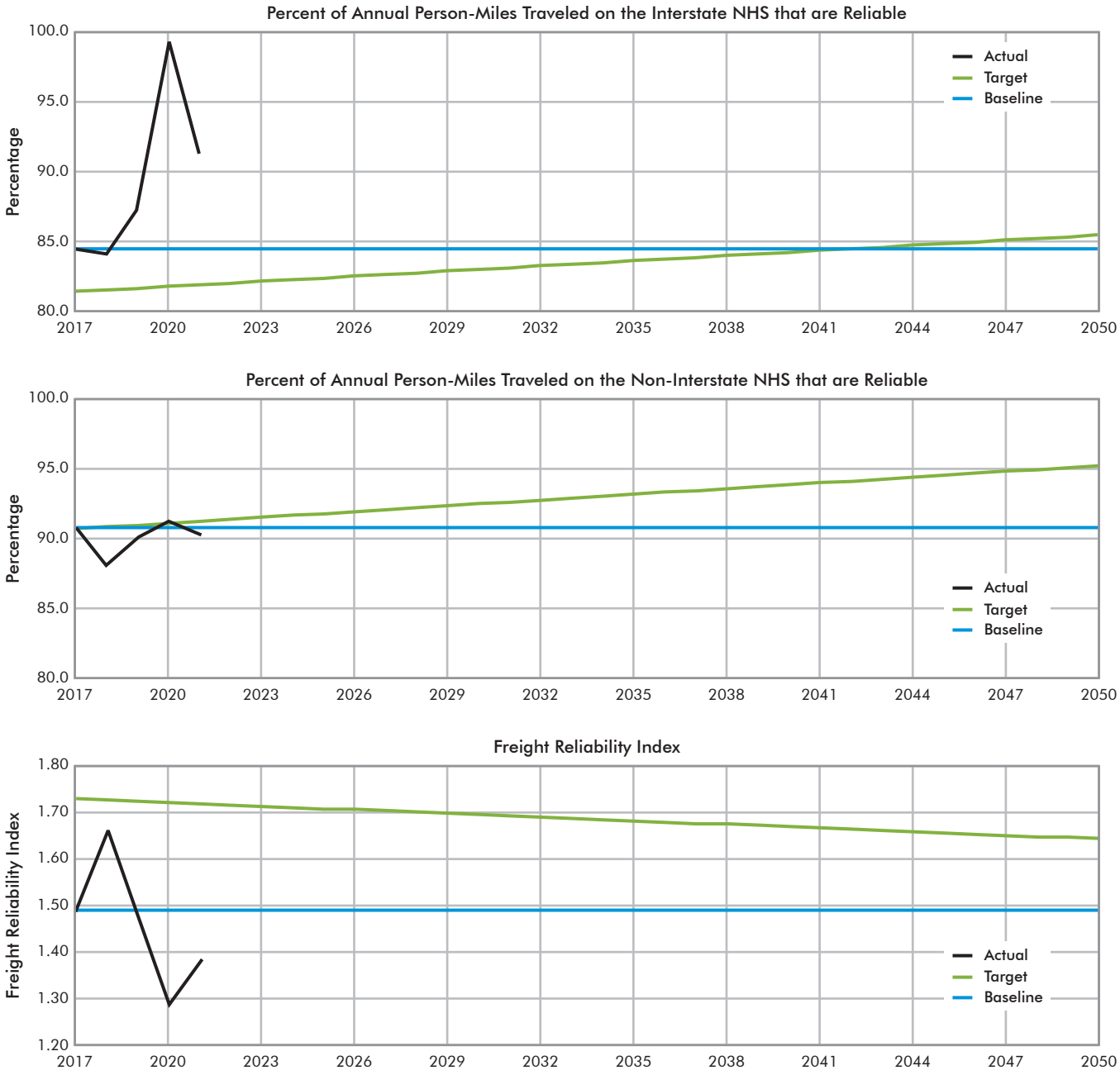
[6] The Congestion Mitigation and Air Quality Improvement (CMAQ) Program was created by the Intermodal Surface Transportation Efficiency Act (ISTEA), enacted in 1991, with a primary goal of directing Federal funding towards transportation programs and projects that help improve air quality and reduce traffic congestion in areas designated by the U.S. Environmental Protection Agency (EPA) as nonattainment or in maintenance of the National Ambient Air Quality Standards (NAAQS). CMAQ projects generally fall into one of three categories: 1) projects that reduce the number of vehicle trips and/or vehicle-miles traveled (VMT), 2) projects that reduce emissions by improving traffic congestion, and 3) projects that reduce emissions through improved vehicle and fuel technologies. Currently, projects in counties that have historically been included in designated nonattainment or maintenance areas are eligible for funding. Thus, as all seven counties in Southeastern Wisconsin are currently, or have previously been, in nonattainment of either the ozone or $PM_{2.5}$ standards, projects located in any of these counties are eligible for funding.

Figure 10
Comparison of Actual Data and Targets for the National Highway System and Freight Reliability Performance Measures



Source: SEWRPC, 12/2023

Table 17
Comparison of Actual 2021 Results to Year 2021 Targets for the National Highway System (NHS) Travel Time Reliability and Freight Reliability Performance Measures for the Metropolitan Planning Area and Seven-County Region

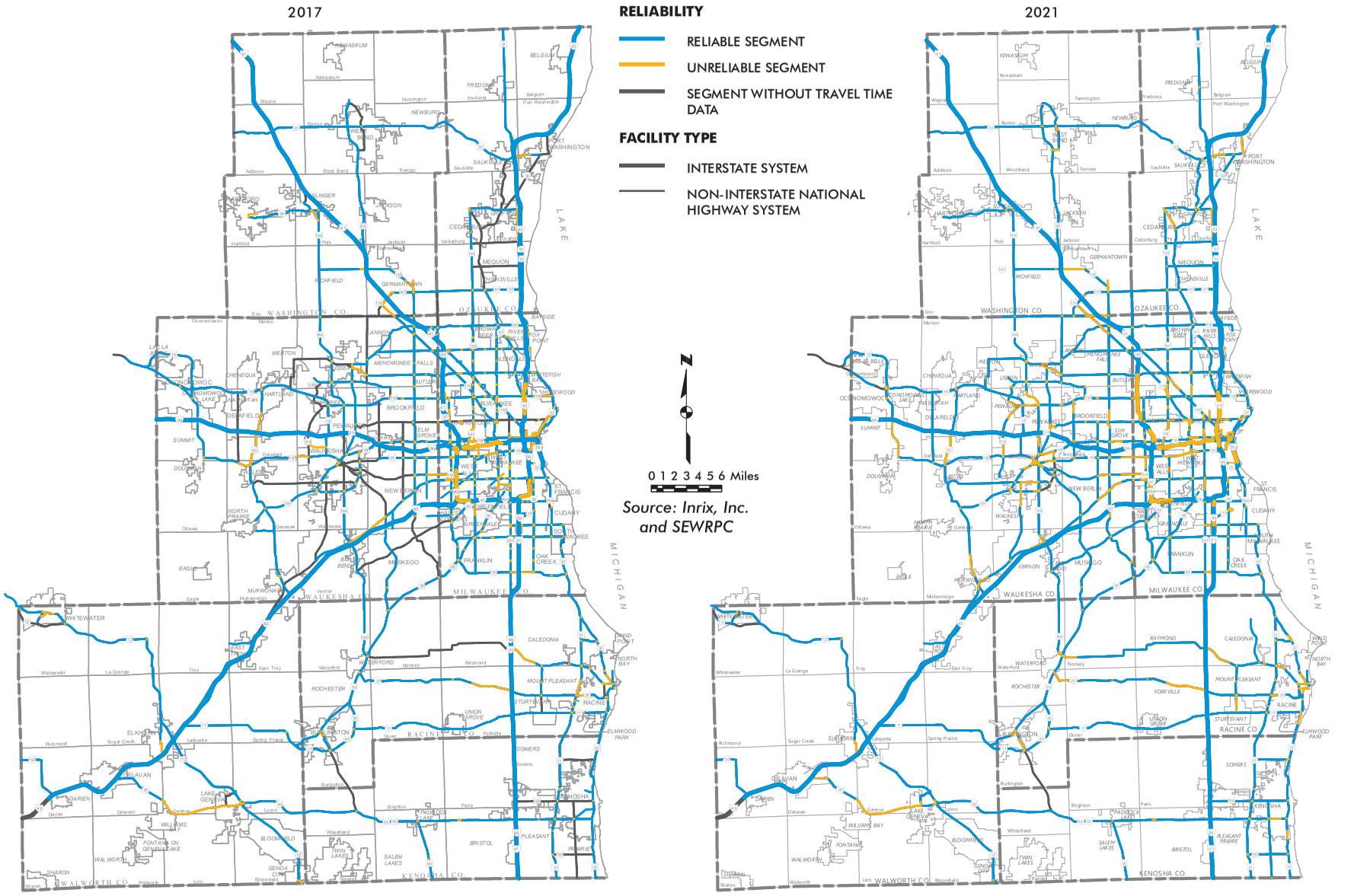
Performance Measure	Metropolitan Planning Area				Seven-County Region			
	Year 2017 Baseline Data	Year 2021 Established Target[a]	Year 2021 Actual Data	Progress Made in Achieving Target	Year 2017 Baseline Data	Year 2021 Established Target[a]	Year 2021 Actual Data	Progress Made in Achieving Target
Travel Time Reliability								
Percent of Person-Miles Traveled on the Interstate NHS that are Reliable	83.9	≥ 81.9	90.9	Yes	84.5	≥ 81.9	91.3	Yes
Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	90.9	≥ 91.2	90.3	No	90.8	≥ 91.2	90.3	No
Freight Reliability								
Freight Reliability Index	1.54	≤ 1.72	1.41	Yes	1.49	≤ 1.72	1.38	Yes

Note: Progress is made in achieving target by either meeting target outright or by improving upon baseline data.

[a] *The Regional and MPA targets are the same.*

Source: WisDOT, Wisconsin Traffic Operations and Safety Laboratory, Inrix, Inc., and SEWRPC; 12/2023

Map 4
National Highway System Travel Time Reliablity in Southeastern Wisconsin: Years 2017 and 2021



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Map 5
Interstate Truck Travel Time Reliablity in Southeastern Wisconsin: Years 2017 and 2021

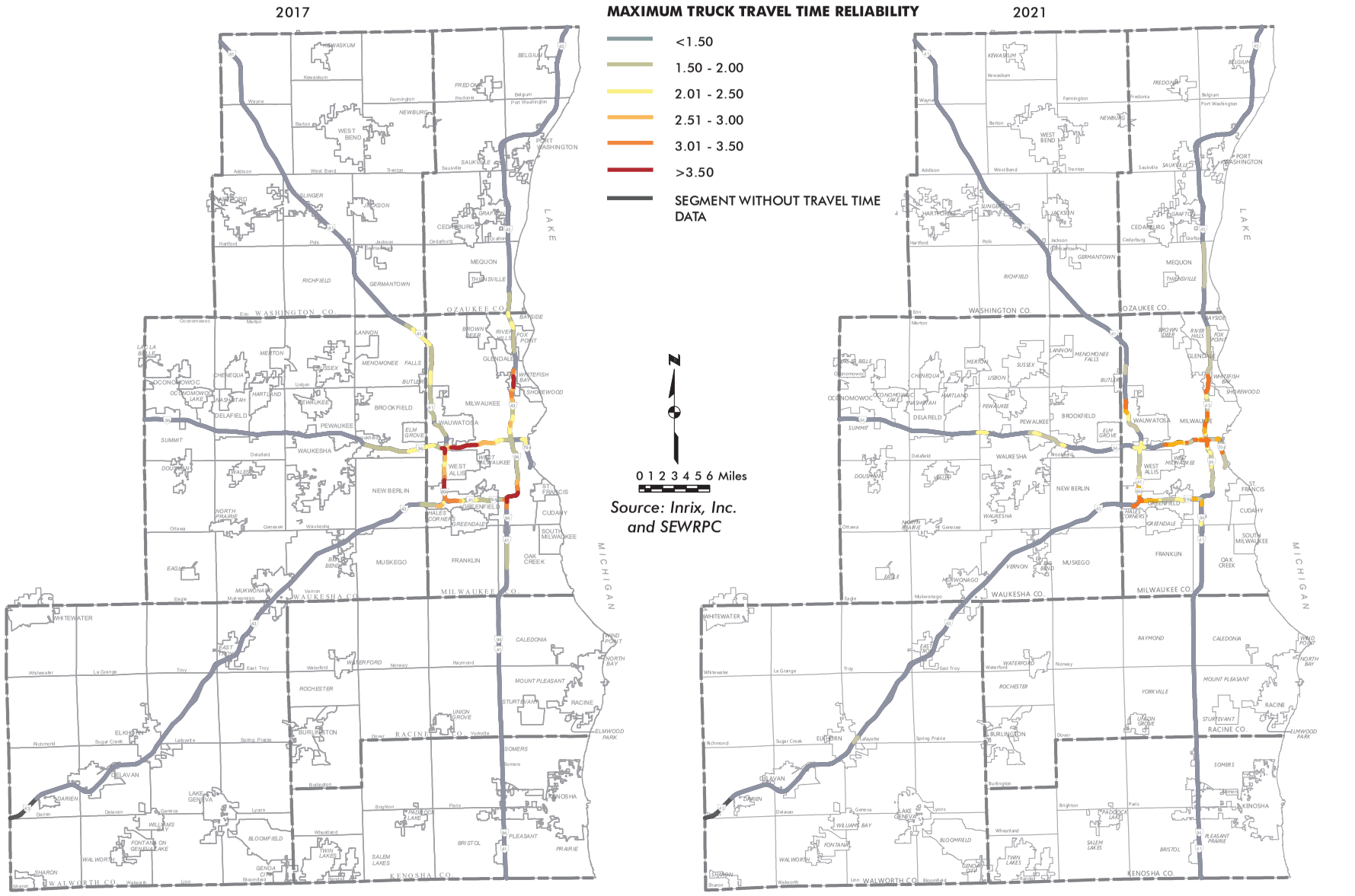

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Table 18
Resulting Year 2025 Targets for National Highway System (NHS) Reliability and Freight Reliability Performance Measures for the Metropolitan Planning Area and Seven-County Region

Performance Measure	Year 2021 Baseline Data		Year 2025 Targets
	Metropolitan Planning Area	Seven-County Region	
Travel Time Reliability			
Percent of Person-Miles Traveled on the Interstate NHS that are Reliable	91.2	91.6	≥ 82.4
Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	93.8	93.8	≥ 91.8
Freight Reliability			
Freight Reliability Index	1.41	1.38	≥ 1.71

Note: Regional and MPA targets are the same.

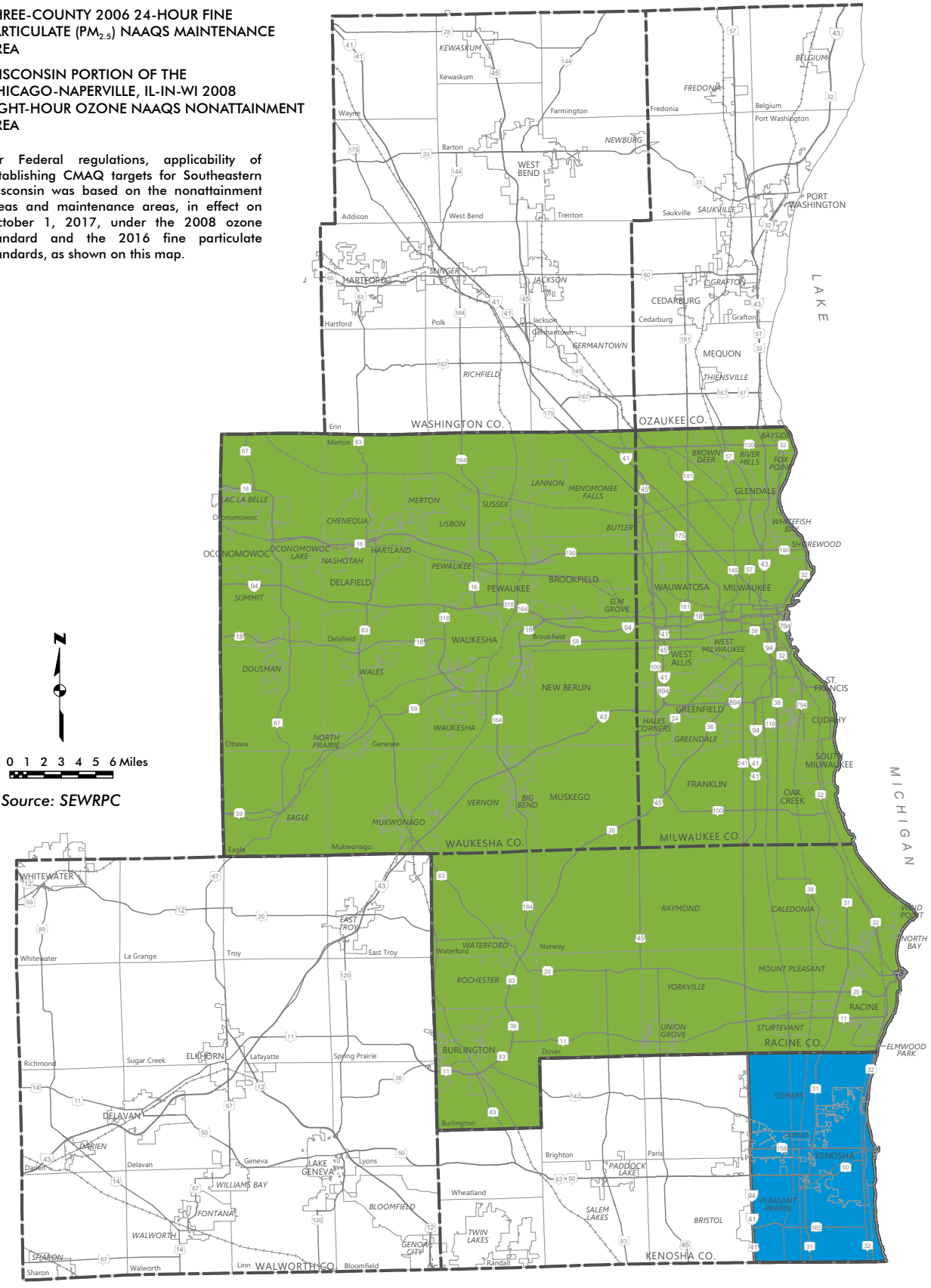
Source: WisDOT, Inrix, Inc., and SEWRPC; 12/2023

Map 6
NAAQS Nonattainment and Maintenance Areas in the Region

THREE-COUNTY 2006 24-HOUR FINE PARTICULATE ($PM_{2.5}$) NAAQS MAINTENANCE AREA

WISCONSIN PORTION OF THE CHICAGO-NAPERVILLE, IL-IN-WI 2008 EIGHT-HOUR OZONE NAAQS NONATTAINMENT AREA

Note: Per Federal regulations, applicability of establishing CMAQ targets for Southeastern Wisconsin was based on the nonattainment areas and maintenance areas, in effect on October 1, 2017, under the 2008 ozone standard and the 2016 fine particulate standards, as shown on this map.



Source: SEWRPC

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The following sections describe the targets previously established for the three CMAQ-related performance measures, reviews progress for achieving the targets, and describes the establishment of new short-term targets for the CMAQ measures. As the three targets are vastly different in their subject and data needs, they are addressed separately.

CMAQ – Peak Hourly Excessive Delay

Figure 11 shows how the PHED measure is to be calculated for the Milwaukee urbanized area. WisDOT and the Commission, per the Federal regulations, must jointly calculate baseline data and establish two-year and four-year targets for the PHED measure for the Milwaukee urbanized area every four years. WisDOT, the Commission staff, and TOPS Lab collaborated on developing the baseline data for the PHED measure.

The year 2017 baseline data and the years 2021 (initial four-year) and 2050 targets[7] for the PHED measure are shown in Table 19. To develop the four-year target, Commission staff and WisDOT developed a methodology to estimate growth rates between the base year 2017 and future year 2021 (four-year target year) utilizing the Commission's fifth-generation travel demand model to estimate changes in total annual average delay per capita during the AM and PM peak hours as a proxy for PHED per capita. By utilizing the travel demand model, the impact of added roadway capacity and anticipated population growth on the PHED measure could be estimated. The modeled results indicated that projects completed between 2017 and 2021—principally the Zoo Interchange reconstruction project and the resurfacing and restriping of IH 94/IH 894 between the Hale and Zoo Interchanges—would positively impact travel in the Milwaukee urbanized area by reducing PHED by approximately 8 percent. Given the uncertainty in forecasting the future, Commission and WisDOT staffs agreed that half of the modeled reduction (4 percent) in PHED would be applied to the base year PHED per capita to estimate the four-year target PHED per capita.

Similarly, the year 2050 PHED target shown in Table 17 was established based on the methodology developed by the Commission staff. The year 2050 target, and the methodology for establishing the target, was intended to guide Commission staff as they collaborate with WisDOT on future short-term targets for the urbanized area.

Following the initial establishment of the PHED target, TOPS Lab regularly provided updates throughout the four-year performance period to WisDOT and Commission staffs to monitor the progress towards achieving the four-year 2021 PHED target. The annual PHED levels, as calculated by TOPS Lab from base year 2017 through 2021, are shown in Figure 12. The PHED levels declined every year between 2017 and 2020, to a low of 2.8. The increased decline between 2019 and 2020 was likely due to the COVID-19 pandemic, which had a dramatic effect on vehicular travel that year. Following that year, the PHED level increased to 5.7 in 2021, to within approximately 10 percent of 2019 levels.

With respect to achievement of the 2021 PHED target, both Figure 12 and Table 20 show that the actual year 2021 PHED data met the year 2021 PHED target. Given that all four years of the calculated PHED data would have met the 2021 target, it is expected that the target would have been likely met regardless of the effects of the COVID-19 pandemic.

For the second four-year cycle for target setting, WisDOT and Commission staffs jointly established two-year (year 2023) and four-year (year 2025) targets for the PHED measure. This differs from the previous performance period with only the four-year target being required to be established. WisDOT, the Commission, and TOPS Lab collaborated on developing the baseline data for the PHED measure, which was done in a similar manner as the previous performance period. Table 21 shows the year 2021 baseline data and the year 2023 (two-year) and 2025 (four-year) targets for the PHED measure established by WisDOT and Commission staffs based on the same methodology used for establishing the previous short-term and year 2050 targets.

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[7] Per Federal regulations, WisDOT and Commission staffs were not required to establish a two-year target for the PHED measure in the initial round of target setting. However, the two agencies will be required to establish a two-year target during the second CMAQ Performance Plan cycle starting in 2022.

Figure 11
Methodology for Calculating the Annual Hours of Peak Hour Excessive Delay (PHED) per Capita Performance Measure

The following is the methodology developed by FHWA for calculating the CMAQ performance measure related to annual hours of PHED per capita.

1. Determine the Excessive Delay Threshold Travel Time (EDTTT) for each reporting segment of the National Highway System (NHS) by the following formula:

$$EDTTT\ (in\ seconds) = 3{,}600 \times \frac{Segment\ Length}{\begin{matrix} Higher\ of\ 20\ mph\ or \\ 0.6 \times Speed\ Limit \end{matrix}}$$

2. Utilizing travel time data from the National Performance Management Research Data Set (NPMRDS), calculate for each NHS reporting segment the travel time segment delay (RSD) for every 15-minute time bin within the following time periods:

   a. 6 a.m. – 10 a.m. (Monday through Friday)
   b. 3 p.m. – 7 p.m. or 4 p.m. – 8 p.m. (Monday through Friday)

$$RSD\ (in\ seconds) = Average\ Travel\ Time\ - EDTTT$$

3. Calculate Excessive Delay (ED) for every 15-minute bin within both time periods with the following formula:

$$ED\ (in\ hours) = \begin{cases} \dfrac{RSD}{3{,}600}\ when\ RSD\ \geq 0 \\ or \\ 0\ when\ RSD < 0 \end{cases}$$

4. Calculate the Average Vehicle Occupancy (AVO) for each segment with the following formula:

$$AVO_{total} = (Percent\ Cars \times\ AVO_{cars}) + (Percent\ Buses \times AVO_{buses}) + (Percent\ Trucks + AVO_{trucks})$$

   Where the percentage for each vehicle can be provided by the State/MPO or by bus, truck, car traffic volume data provided for the HPMS, and the AVO for each vehicle type can be provided by the State and/or MPO.

5. Calculate the Total Excessive Delay (TED) for each NHS report segment to the nearest hundredth for the entire year by the following formula:

$$Segment\ TED\ (in\ person-hours) = \sum \left(AVO_{total} \times ED \times \frac{hourly\ volume}{4} \right)$$

   Where the hourly volume is estimated by the State and/or MPO for all days and for all reporting segments where ED is measured.

6. Calculate the performance measure by the following formula:

$$Annual\ Hours\ of\ PHED\ per\ Capita = \frac{\sum Segment\ TED}{Total\ Population}$$

   Where the Total Population is the total population in the urbanized area from the most recent annual population published by the U.S. Census.

Source: Federal Highway Administration and SEWRPC, 12/2023

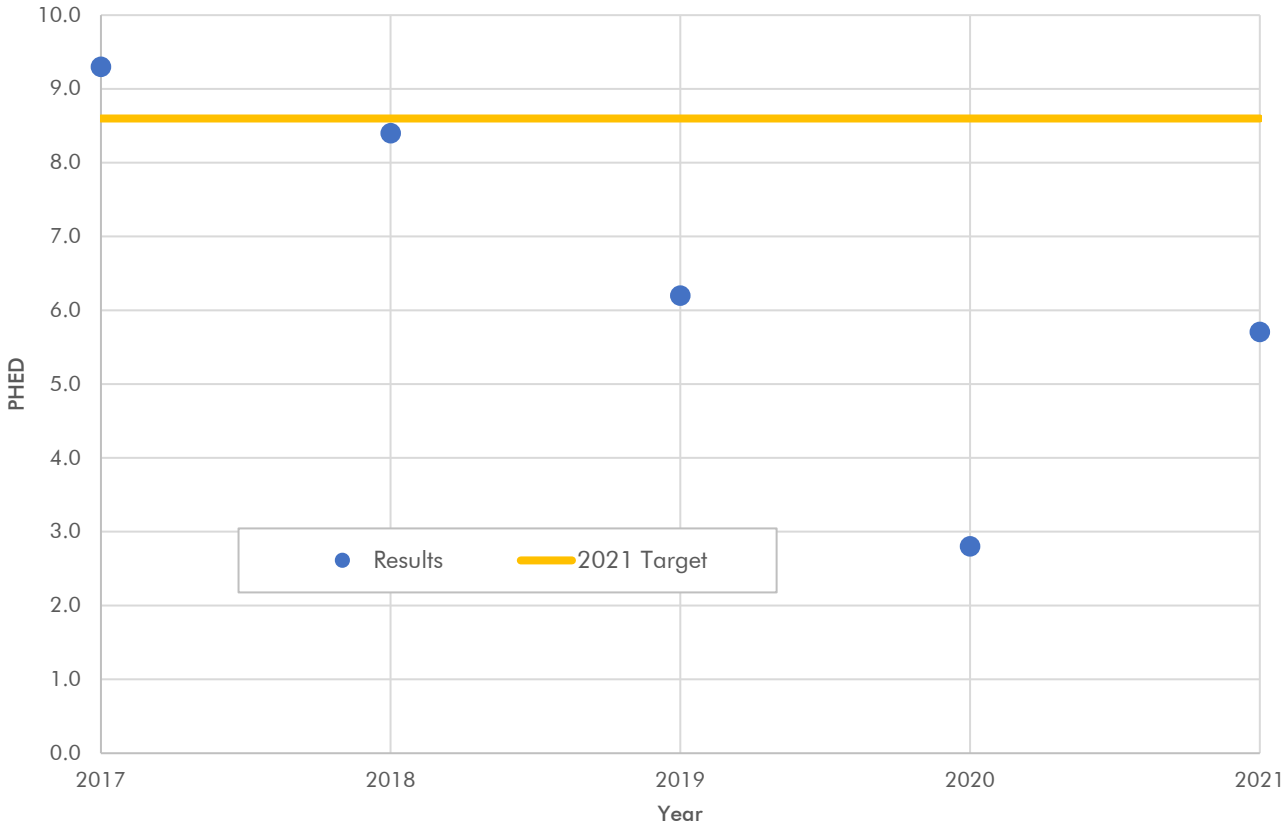
Table 19
Years 2021 and 2050 Peak Hourly Excessive Delay Targets for the Milwaukee Urbanized Area Within Southeastern Wisconsin

Performance Measure	Year 2017 Baseline Data	Year 2021 Target	Year 2050 Target
Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita	8.96	≤ 8.60[a]	≤ 7.84

[a] *Per regulations, this target was established jointly by the Wisconsin Department of Transportation and the Commission.*

Source: WisDOT, Wisconsin Traffic Operations and Safety Laboratory, Inrix, Inc., and SEWRPC; 12/2023

Figure 12
Peak Hour Excessive Delay (PHED) in the Milwaukee Urbanized Area



Source: WisDOT, Wisconsin Traffic Operations and Safety Laboratory, Inrix, Inc., and SEWRPC; 12/2023

Table 20
Comparison of Peak Hour Excessive Delay (PHED) Year 2021 Actual Data to Year 2021 Target for the Milwaukee Urbanized Area

Year 2017 Baseline Data	Year 2021 Actual Data	Year 2021 Target	Achievement of Year 2021 Target
8.96	5.71	≤ 8.60[a]	Target met

Source: WisDOT, Wisconsin Traffic Operations and Safety Laboratory, Inrix, Inc., and SEWRPC; 12/2023

Table 21
Traffic Congestion-Related CMAQ PHED Per Capita Target for the Milwaukee Urbanized Area

Performance Measure	Year 2021 Baseline Data	Year 2023 Target	Year 2025 Target
Annual Hours of PHED per Capita	5.7	≤ 8.6[a]	≤ 8.4[a]

[a] *Per Federal regulations, this target was established jointly by the Wisconsin Department of Transportation and SEWRPC.*

Source: WisDOT, Wisconsin Traffic Operations and Safety Laboratory, Inrix, Inc., and SEWRPC; 12/2023

CMAQ – Non-Single Occupancy Vehicle Travel

Figure 13 shows how the non-SOV measure is to be calculated for the Milwaukee urbanized area. Federal regulations require the Commission and WisDOT to use the same travel time data set for calculating the non-SOV measure, and the two agencies are required to establish and report unified non-SOV baseline and two-year and four-year target values for the Milwaukee urbanized area. As shown in Figure 13, there are three sources of data that are permitted to be utilized for this measure. Based on data being readily available, WisDOT and Commission staffs calculated the non-SOV measure using the five-year estimate for "Commuting to Work" totaled by mode from the U.S. Census Bureau's American Community Survey (ACS) data set for the Milwaukee urbanized area.

The base year data, the year 2019 (two-year) target, and the year 2021 (four-year) target for the non-SOV measure for the Milwaukee urbanized area are shown in Table 22. To establish the targets for the non-SOV measure, WisDOT and Commission staffs considered three alternative methodologies to estimate years 2019 (two-year) and 2021 (four-year) targets: 1) based on the historical non-SOV travel trend, 2) based on the VISION 2050-modeled non-SOV travel, and 3) based on the fiscally constrained transportation system (FCTS)-modeled non-SOV travel. It was agreed that an averaging of the potential targets based on historical trends and the FCTS model would be used to set the two-year and four-year targets for non-SOV travel.

In addition to the years 2019 and 2021 non-SOV targets established jointly by WisDOT and Commission staffs for the Milwaukee urbanized area, the Commission staff established year 2050 targets based on the methodology developed by the Commission staff, as shown in Table 22. The year 2050 target, and the methodology used for establishing the target, will guide Commission staff as they collaborate with WisDOT on future short-term targets for the urbanized area.

Figure 14 shows a comparison of the actual years 2018 through 2021 non-SOV ACS data to the established years 2019 and 2021 non-SOV targets and the three non-SOV forecasts developed for the three alternative methodologies utilized to establish the targets. As shown in Figure 14, the percent of non-SOV travel from the ACS essentially continued the recent historical trend of declining non-SOV travel for the years 2018 through 2020. However, the non-SOV travel increased by about 2 percent between years 2020 and 2021, exceeding the historical trend and the FCTS and VISION 2050 forecasts for 2021. In reviewing the ACS data, the increase in the percentage of non-SOV travel in the latest years data was predominantly the result of a similar increase in the percentage of people working from home, likely due to the global COVID-19 pandemic occurring at that time.

For purposes of the national performance management framework, Table 23 shows a comparison of the years 2019 and 2021 non-SOV targets to the actual ACS data. For the two-year target, the actual ACS data of 20.0 percent is slightly below the year 2019 target of 20.2 percent. However, considering the margin of error for the year 2019 data was +/- 0.4 percent, it could be considered that the Milwaukee urbanized area met the two-year target. As was previously indicated, due to the COVID-19 pandemic likely increasing the non-SOV percent to 21.6 for the year 2021 ACS data, the Milwaukee urbanized area also met the four-year non-SOV target of 20.1 percent.

During 2022, WisDOT and Commission staffs established years 2023 (two-year) and 2025 (four-year) non-SOV targets, per Federal requirements, for the Milwaukee urbanized area. In establishing the future years 2023 (two-year) and 2025 (four-year) non-SOV targets, WisDOT and Commission staffs once again considered potential targets based on the three potential forecasting methods previously utilized. Given that travel and work patterns were affected by the COVID-19 pandemic in 2020 and 2021 and by record-high gasoline prices in 2022, it was expected by Commission and WisDOT staffs that the five-year ACS non-SOV data would continue to remain at a higher level for both future years 2023 and 2025. As such, the Commission and WisDOT staffs agreed to base the years 2023 and 2025 targets consistent with the methodology utilized to establish the year 2050 target. Table 24 shows the years 2023 and 2025 non-SOV targets jointly established with WisDOT staff for the Milwaukee urbanized area.

Figure 13
Methodology for Calculating the Non-Single Occupancy Vehicle (Non-SOV) Performance Measure

FHWA provided three methodologies that can be utilized to calculate the CMAQ performance measure related to percent of non-SOV travel in an urbanized area. The following describe the three methodologies:

1. Utilize SOV travel data that are available from the U.S. Census American Community Survey to calculate the performance measures with the following formula:

   $$Percent\ of\ non\text{-}SOV\ Travel = 100\ percent - percent\ of\ SOV\ Travel$$

2. Utilize the percent of non-SOV travel, as calculated using data derived from a local survey that was conducted within the last two years.

3. Calculate the percent of non-SOV travel based on system monitoring data of the actual use of the transportation system. Sample or continuous measurements may be utilized to count the number of travelers using different modes of transportation. The results of the measurements would need to be factored to represent the travel on the entire transportation system and be representative of annual travel. Additionally, the percent of non-SOV travel would need to be updated at least every two years.

Source: Federal Highway Administration and SEWRPC, 12/2023

Table 22
Years 2021 and 2050 Non-Single Occupancy Vehicle Travel Targets for the Milwaukee Urbanized Area Within Southeastern Wisconsin

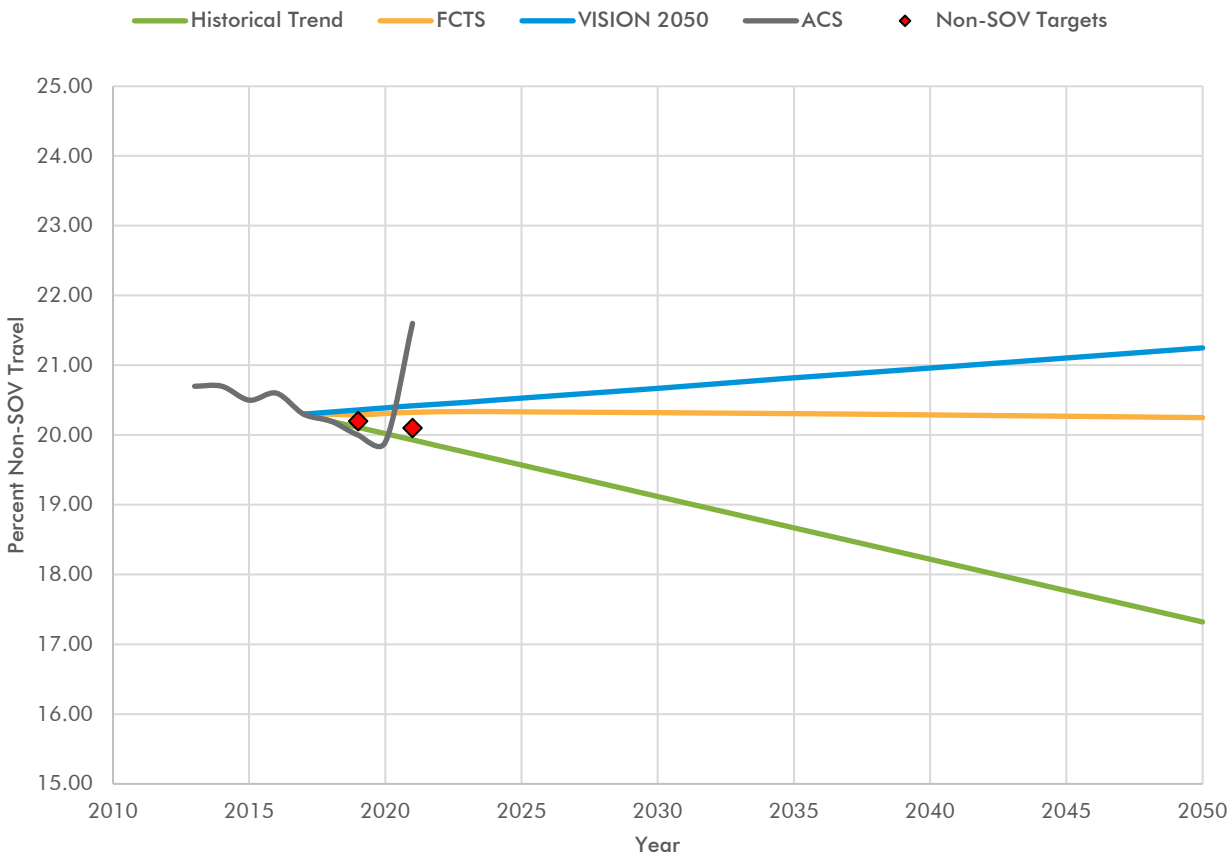
Performance Measure	Year 2017 Baseline Data	Year 2019 Target	Year 2021 Target	Year 2050 Target
Percent of Non-SOV Travel	20.3[a]	≥ 20.2[b]	≥ 20.1[b]	≥ 21.2

[a] *From the U.S. Bureau of the Census' 2012-2016 American Community Survey Journey to Works data.*

[b] *Per regulations, this target was established jointly by the Wisconsin Department of Transportation and the Commission.*

Source: U.S. Census American Community Survey, WisDOT, and SEWRPC; 12/2023

Figure 14
Comparison of Actual Non-Single Occupancy Vehicle (Non-SOV) Data from the American Community Survey (ACS) to the Non-SOV Target and Three Alternative Target Setting Methodologies



Source: U.S. Bureau of the Census, WisDOT, and SEWRPC; 12/2023

Table 23
Comparison of Milwaukee Urbanized Area Non-Single Occupancy Vehicle (Non-SOV) Year 2021 Actual Data to Year 2021 Target

Year 2017 Baseline Data	Year 2021 Actual Data	Year 2021 Target	Progress Made in Achieving Target
20.3[a]	21.6[b]	≥ 20.1	Yes

Note: Progress is made in achieving target by either meeting target outright or by improving upon baseline data.

[a] *Only the 2012-2016 American Community Survey data were available at the time of the establishment of the required year 2017 baseline data.*

[b] *Only the 2016-2020 American Community Survey data were available at the time of the required final assessment of progress towards achieving the year 2021 target.*

Source: U.S. Bureau of the Census, WisDOT, and SEWRPC; 12/2023

Table 24
Traffic Congestion-Related CMAQ Non-SOV Travel Target for the Milwaukee Urbanized Area

Performance Measure	Year 2021 Baseline Data	Year 2023 Target	Year 2025 Target
Percent of Non-SOV Travel	21.60[b]	≥ 20.50[a]	≥ 20.50[a]

[a] *Per Federal regulations, this target was established jointly by the Wisconsin Department of Transportation and SEWRPC.*

[b] *From the 2016-2020 American Community Survey Journey to Works data.*

Source: WisDOT, Wisconsin Traffic Operations and Safety Laboratory, Inrix, Inc., and SEWRPC;12/2023

CMAQ – Emission Reductions

The methodology for calculating the emission reduction measure is shown in Figure 15. Unlike the two congestion-related CMAQ measures, this measure is to be calculated separately by the State for a statewide target and the Commission for the MPA. The data to be utilized for this measure are the emission reduction estimates for projects implemented using CMAQ funding, as entered by WisDOT into the CMAQ Public Access System. Thus, this measure is the only performance measure established by FHWA that is linked entirely to the implementation of projects funded by a particular funding source.

The two-year and four-year emission reduction targets for the State are shown in Table 25. While not required by Federal regulations, WisDOT and the Commission jointly developed the targets for the State. In developing the targets, WisDOT and Commission staffs considered the estimated emission reductions attributable to CMAQ-funded projects that were previously implemented and CMAQ projects that would be implemented within the next two to four years. The Commission established two-year and four-year emission reduction targets based on the share of CMAQ projects expected to be implemented within the MPA and the Region.

Following completion of the baseline CMAQ Performance Plan for years 2018-2021, there were three solicitations for new CMAQ projects during this time period—one completed in 2019 for years 2021-2022 CMAQ funding, one in 2020 for years 2023-2024 CMAQ funding, and one in 2022 for years 2025-2026 CMAQ funding. In addition, WisDOT approved projects in 2018 for CMAQ funding as part of the State's Commute to Careers program.

Table 26 shows a comparison of the years 2018-2021 estimated actual emissions reductions to the 2018-2021 emission reduction targets. The comparison shows that none of the emission reduction targets were met. In reviewing the projects included in the establishment of the original targets, Commission staff discovered that two projects should not have been included in the original targets. In addition, while new CMAQ projects were programmed subsequent to the establishment of the emission reduction targets, the actual emissions reductions of these projects were less than anticipated. This was mainly due to the overall fleet of vehicles in the Region becoming cleaner. However, even though the emission reduction targets were not met, the CMAQ projects completed or initiated during the years 2018-2021 did contribute to a decrease in emissions in the Region.

Following the establishment of new years 2022-2023 (two-year) and 2022-2025 (four-year) statewide targets in December 2022, the Commission staff established regional short-term targets in June 2023, as shown in Table 27. The two-year emission reduction target was developed based on the emission reductions estimated for projects completed or programmed in years 2022 and 2023. The incremental increase between the two- and four-year emission reduction targets was calculated from the emission reductions estimated for projects programmed in years 2024 and 2025 and from an estimate of the potential emission reductions for projects selected from the next funding cycle expected to be awarded in 2024. The potential emission reductions for the next funding cycle were calculated based on an average of the estimated emission reductions for projects awarded CMAQ funding in the latest two funding cycles. These targets were added to the years 2023-2026 TIP on June 14, 2023, by approval by the Commission's Advisory Committees on Transportation System Planning and Programming for the Kenosha, Milwaukee, Racine, Round Lake Beach, and West Bend Urbanized Areas and the Commission itself.

Figure 15
Methodology for Calculating the Total Emission Reductions Performance Measures

The following describes the methodology that FHWA developed for calculating the CMAQ performance measures related to total emission reductions. The performance measures are calculated for each criteria pollutant that a portion of the State or metropolitan planning area is in non-attainment or maintenance for. In Southeastern Wisconsin, the three criteria pollutants that an emission reduction measure is to be calculated are for Fine Particulate Matter ($PM_{2.5}$), Volatile Organic Compound (VOC), and Nitrogen Oxide (NO_x).

1. Calculate the performance measures for each relevant criteria pollutant by totaling over a two- or four-year period the total estimated emission reduction estimated to have occurred from projects previously implemented with CMAQ funding (for baseline data and monitoring progress) or estimated to occur through implementation of CMAQ projects.

Source: Federal Highway Administration and SEWRPC, 12/2023

Table 25
Emissions Reduction-Related CMAQ Targets for Southeastern Wisconsin

Performance Measure	Years 2014-2017 Baseline Data[a]	Years 2018-2019 Target	Years 2018-2021 Target[b]
Reduction in VOC[c](kg/day)	41.268	≥ 10.860	≥ 27.032
Reduction in NOx[d] (kg/day)	109.545	≥ 83.316	≥ 137.350
Reduction in $PM_{2.5}$[e] (kg/day)	3.291	≥ 7.797	≥ 12.096

[a] *Emission reductions estimated for all of the projects implemented with CMAQ funding over the four-year period of 2014 through 2017.*

[b] *While not required by regulations, WisDOT and SEWRPC jointly developed two- and four-year emission reduction targets for the State. SEWRPC established two- and four-year emission reduction targets for Southeastern Wisconsin based on the share of statewide CMAQ projects expected to be implemented within the MPA and the Region.*

[c] *Volatile organic compounds.*

[d] *Nitrogen oxides.*

[e] *Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.*

Source: WisDOT and SEWRPC, 12/2023

Table 26
Comparison of Southeastern Wisconsin Emissions Reduction Years 2018-2021 Actual Data to Years 2018-2021 Targets

Performance Measure	Years 2014-2017 Baseline Data[a]	Years 2018-2021 Actual Data	Years 2018-2021 Target	Progress Towards Achieving Targets
Reduction in VOC[b] (kg/day)	41.268	13.370	≥ 27.032	No
Reduction in NOx[c] (kg/day)	109.545	64.980	≥ 137.350	No
Reduction in $PM_{2.5}$[d] (kg/day)	3.291	6.228	≥ 12.096	No

Note: Progress is made in achieving target by either meeting target outright or by improving upon baseline data.

[a] *Based on the estimated emission reductions for all of the projects implemented with CMAQ funding over the four-year period of 2014 through 2017. As the data represent four years of emission reductions, the baseline data were not considered in the review of progress towards achieving the emission reduction targets.*

[b] *Volatile organic compounds.*

[c] *Nitrogen oxides.*

[d] *Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.*

Source: WisDOT and SEWRPC, 12/2023

Table 27
Regional Emission-Related CMAQ Targets

Performance Measure	Years 2018-2021 Baseline Data[a]	Years 2022-2023 Target[b]	Years 2022-2025 Target[b]
Reduction in VOC[c] (kg/day)	14.653	≥4.999	≥6.361
Reduction in NO_x[d] (kg/day)	66.459	≥14.462	≥17.661
Reduction in $PM_{2.5}$[e] (kg/day)	6.475	≥2.451	≥2.882

[a] *Emission reductions estimated for all of the projects implemented with CMAQ funding over the four-year period of 2018 through 2021.*

[b] *Two-year emission reduction target was developed based on the emission reductions estimated for projects completed or programmed in years 2022 and 2023. The incremental increase between the two- and four-year emission reduction targets was calculated from the emission reductions estimated for projects programmed in years 2024 and 2025 and from an estimate of the potential emission reductions for projects selected from the next funding cycle expected to be awarded in 2024. The potential emission reductions for the next funding cycle were calculated based on an average of the estimated emission reductions for projects awarded CMAQ funding in the latest two funding cycles.*

[c] *Volatile organic compounds.*

[d] *Nitrogen oxides.*

[e] *Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.*

Source: WisDOT and SEWRPC, 12/2023