

DRAFT

READING AREA TRANSPORTATION STUDY

**ANNUAL
PAVEMENT
AND BRIDGE
CONDITION
REPORT 2021**

SPRING 2023

**READING AREA TRANSPORTATION STUDY
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SECTION 1

ACRONYMS AND DEFINITIONS

AADT – Average Annual Daily Traffic (AADT) is the total number of vehicles traveling along a roadway segment on an average day.

Arterials – an arterial road delivers traffic between collector roads and freeways

BMS – The Bridge Management System, which is the primary means for defining and monitoring state-owned bridges, maintaining an inventory of the bridge features, conditions, and characteristics, and providing decision-makers with the information necessary for funding, business planning, project design, and maintenance programming.

Bridge Condition Rating Culvert – Single-digit number that describes the physical condition of the culvert compared to its original as-built condition. Number is assigned by state-certified bridge inspectors during each inspection of the bridge, which occurs at least every two years. Number range is nine to zero.

Bridge Condition Rating Deck – Single-digit number that describes the physical condition of the deck compared to its original as-built condition. Number is assigned by state-certified bridge inspectors during each inspection of the bridge, which occurs at least every two years. Number range is nine to zero.

Bridge Condition Rating Sub – Single-digit number that describes the physical condition of the substructure compared to its original as-built condition. Number is assigned by state-certified bridge inspectors during each inspection of the bridge, which occurs at least every two years. Number range is nine to zero.

Bridge Condition Rating Super – Single-digit number that describes the physical condition of the superstructure compared to its original as-built condition. Number is assigned by state-certified bridge inspectors during each inspection of the bridge, which occurs at least every two years. Number range is nine to zero.

Collectors – provide land access and traffic circulation within residential neighborhoods, commercial and industrial areas, and downtown city centers. Collectors connect local roads and streets with arterials and provide less mobility than arterials at lower speeds for a shorter distance.

Culvert – a curved or rectangular structure below the roadway surface used primarily for water flow

Deck – Top surface of bridge that carries traffic

DVMT – Daily Vehicle Miles Traveled shows how much traffic is flowing along a roadway during an average 24 hour period. This is calculated by multiplying the AADT by the length of the roadway.

FFY – Federal Fiscal Year

Interstate System – the highest classification of arterial roads and streets and provides the highest level of mobility, at the highest speed, for a long uninterrupted distance.

LFA – Local Federal Aid roads are a collection of roads in the county that are eligible for federal funds.

Local Roads – The local roads and streets provide a high level of access to abutting land, but limited mobility.

MPO – Metropolitan Planning Organization. Organization of several municipalities that serve areas with greater than 50,000 people for the purpose of planning in a more comprehensive manner.

PennDOT – Pennsylvania Department of Transportation

RATS – Reading Area Transportation Study. RATS is the Metropolitan Planning Organization (MPO) for Berks County.

RMS – The Roadway Management System, which is the primary means for defining and monitoring the state-owned highway network, maintaining an inventory of the roadway features, conditions, and characteristics, and providing decision-makers with the information necessary for funding, business planning, project design, and maintenance programming.

Substructure – the part of the bridge that supports the superstructure, such as piers and abutments

Superstructure – the underlying or supporting part of a bridge, for example steel members under the deck

Introduction

The Reading Area Transportation Study (RATS) Coordinating Committee is the designated Metropolitan Planning Organization (MPO) for transportation in Berks County. RATS facilitates the regional, performance-based planning process that serves as the basis for spending state and federal transportation funds for improvements to streets, highways, bridges, public transit, bicycle and pedestrian networks allocated to Berks County. RATS is currently responsible for prioritizing approximately \$75 million annually to advance transportation improvement projects throughout the county.

To receive federal funding, transportation projects must be identified in the Long Range Transportation Plan (LRTP). The LRTP examines socioeconomic trends that affect travel, the current state of the county transportation network, and describes multimodal transportation strategies to address identified transportation needs. The plan outlines the region's long-range transportation vision and projects the transportation needs of the county through the year 2045. The plan must be updated every four years and must project at least 20 years into the future to meet federal requirements.

RATS also approves the Transportation Improvement Program (TIP) which is the capital-funding program that contains all surface transportation projects eligible for federal funding that are programmed for implementation over the next four years. Projects scheduled in the TIP were first identified in the LRTP as projects that would impact transportation needs in the county. The most recently adopted TIP (FFY 2023-2026, locally approved July 14, 2022) was approved by FHWA/FTA on September 29, 2022. The TIP lists 131 projects totaling \$303.2 million for highway, bridge, and transit projects over the four-year period from 2023 to 2026.

It is important to address the COVID-19 pandemic. The pandemic has had worldwide impacts to everything from politics and culture to economy and ecology. The transportation system was not exempt from the impacts of the pandemic. As a result, information gathered for this plan exhibits skewed results primarily for the year 2020 and in some instances for 2021. Difficulties in data gathering and availability, as well as changes in the way the world operates contributed to the variance in the data obtained.

RATS Concurrence with Statewide Performance Measures

The Moving Ahead for Progress in the 21st Century Act (MAP-21) and Fixing America's Surface Transportation (FAST) Act established a series of performance measures to ensure effective use of Federal transportation funds.

PennDOT has established performance measures for pavements and bridges to help drive investment decisions to meet PennDOT's overall asset management strategy. Performance measures, along with long-term and short-term targets are set for various road and bridge groups, and the actual data for Berks County for the reporting year are evaluated in PennDOT's annual reports. The current reports, showing the data for the prior calendar year are included in the appendices of this report.

Title 23 Part 490 of the Code of Federal Regulations (23 CFR 490) establishes measures to assess the conditions of pavement and bridges on the National Highway System (NHS), which are collectively referred to as the PM-2 measures. PM-2 Performance Measures include:

- 1) Percentage of pavements on the Interstate System in Good condition
- 2) Percentage of pavements on the Interstate System in Poor condition
- 3) Percentage of pavements on the NHS (excluding the Interstate System) in good condition
- 4) Percentage of pavements on the NHS (excluding the Interstate System) in Poor condition
- 5) Percentage of NHS bridge deck area classified as in good condition
- 6) Percentage of NHS bridge deck area classified as in poor condition

By evaluating these performance measures, the targets established are based on data driven trend analysis.

In addition, federal regulations require MPOs to establish baseline targets either by agreeing to plan and program projects in support of the PennDOT targets or by establishing their own quantifiable targets. RATS most recently adopted the recommended state performance measures and targets in March 2023. The following table identifies these targets.

PM-2 BASELINE AND TARGET VALUES FOR 2022-2025 PERFORMANCE PERIOD

PERFORMANCE MEASURE	URBAN- IZED AREA	2021 BASELINE	2023 2-YEAR TARGET	2025 4-YEAR TARGET
Percentage of Pavements of the Interstate System in Good Condition	Statewide	68.8%	69.0%	65.0%
Percentage of Pavements of the Interstate System in Poor Condition	Statewide	0.4%	2.0%	2.0%
Percentage of Pavements of the Non-Interstate NHS in Good Condition	Statewide	37.2%	31.0%	29.0%
Percentage of Pavements of the Non-Interstate NHS in Poor Condition	Statewide	1.5%	6.0%	6.5%
Percentage of NHS Bridges Classified as in Good Condition	Statewide	27.5%	28.0%	28.0%
Percentage of NHS Bridges Classified as in Poor Condition	Statewide	4.4%	7.5%	7.5%

As Reading MPO's interests extend beyond those included in PennDOT's Performance Measure Annual Reports, the data will be analyzed not only for road and bridge groups for PennDOT-owned assets but Local Federal Aid (LFA) roads and locally owned bridges. At the beginning of Section 2 and Section 3, the differences between the PennDOT annual report and the Reading MPO report are displayed.

For both pavements and bridges, every effort will be made to match the time frame, conditions and data included in the PennDOT annual reports. The data in this report comes from the Roadway Management System (RMS) and the Bridge Management System 2 (BMS2). Discrepancies arise due to lags in data updates and data retrieval dates. The data date for PennDOT's Performance Measure Reports is December 31st for the year reported. The data retrieval date for LFA roads and Local Bridges vary based on the year from 2017 through 2021, however will be pulled consistently during the first week of January for the prior year moving forward.

Goal

Our experience and perception of the transportation system is largely based on the condition of the roads and bridges we drive on every day. This report is prepared for the Reading Metropolitan Planning Organization (Reading MPO) detailing the conditions of the roads and bridges throughout Berks County. This report will help guide investment decisions to keep Berks County's roads and bridges in good order by determining potential projects for inclusion in the Reading Area Transportation Study Transportation Improvement Program and Long Range Transportation Plan.

SECTION 2

PAVEMENTS

Roadway Background and Data

The regional highway system functions as the primary means of distributing people and goods within and throughout Berks County. 51.4 miles of Interstate and 36.8 miles of expressways accommodate most of the highway traffic. Historically, Berks County has been served by a radial system of five major arterial highways. U.S. 222 is the principal link between Reading and both Allentown and Lancaster, as well as a connection to the Pennsylvania Turnpike. PA 61 is the principal highway connection between Reading and Schuylkill County.

U.S. 422 provides a direct link to the Delaware Valley market center to the east. To the west, U.S. 422 connects Reading to Lebanon, Harrisburg, and the Capitol Region. Berks County has no interstate link that crosses through the core urban area; however, Interstate 78 to the north and the Pennsylvania Turnpike (I-76) to the south bound the county. PA 183 and PA 61 act as connectors to I-78, while I-176 and U.S. 222 South link the urban area to the Turnpike.

The following tables look at the 3,334.2 linear miles of Berks County roads in more detail. A majority of Berks County Roads are owned by local government entities and PennDOT.

BERKS COUNTY ROAD OWNERSHIP BY AGENCY 2021		
AGENCY	LINEAR MILES	%
Local	2,402.19	72.05%
PennDOT	873.68	26.20%
Other State/Federal	53.61	1.61%
Turnpike	4.74	0.14%
Total	3,334.22	100.00%

Source: PennDOT, Pennsylvania Highway Statistics, 2021

The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. The NHS was developed by the Department of Transportation (DOT) in cooperation with states, local officials, and Metropolitan Planning Organizations (MPOs). The NHS includes interstates, other principal arterials, strategic highway network, major strategic highway connectors, and intermodal connectors. Berks County has 185.2 miles of roads on the NHS and two intermodal connectors with a majority of these miles being Interstate 78, Interstate 176, and routes 12, 61, 222, and 422. The Berks County NHS experienced a DVMT of 5,529,183 in 2021.

NATIONAL HIGHWAY SYSTEM (NHS) IN BERKS COUNTY 2021	
AGENCY	LINEAR MILES
Local	0.5
PennDOT	180.0
Turnpike	4.7
Total	185.2

Source: PennDOT, Pennsylvania Highway Statistics, 2021

The Federal Aid System (with the exception of rural minor collectors and local roads) is a collection of roads in the county that are eligible for federal funds. In 2021, the federal aid system represented 734.7 linear miles, or 22.04% of all roadways in Berks County.

FEDERAL AID SYSTEM IN BERKS COUNTY 2021	
AGENCY	LINEAR MILES
Local	140.3
PennDOT	594.4
Total	734.7

Source: PennDOT, Pennsylvania Highway Statistics, 2021

The Berks County Roads by Functional Class table shows the federal functional classifications assigned to roads in Berks County. The functional classification of a road may change over time based on changing traffic conditions. Classification of a road is based on an analysis of the volume of traffic using the facility, the type of trip provided, the length of the trip, and the speed of the trip.

Arterials provide the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control. These roads are typically classified as principal arterials (sub-grouped by Interstate, Freeway/Expressway, and other principal arterials) and minor arterials.

Collectors provide a lower level of service at a slower speed. They provide a lower level of service for shorter distances by collecting traffic from local roads and connecting them with arterials. Collectors are classified as major collectors and minor collectors. Local roads and streets are, by far, the most numerous of the road types in the county, accounting for 72.98% of all roads. These roads provide access to individual properties and serve short distance, low speed trips.

ROADS BY FUNCTIONAL CLASS IN BERKS COUNTY 2021		
ROAD CLASS	MILES	%
Local	2,433.3	72.98%
Minor Collector	161.4	4.84%
Major Collector	353.8	10.61%
Minor Arterial	202.3	6.07%
Principal Arterial	95.2	2.86%
Interstate	51.4	1.54%
Other Freeway/Expressway	36.8	1.10%
Total	3,334.2	100.00%

Source: PennDOT, Pennsylvania Highway Statistics, 2021

Just as the more miles put on a vehicle add wear and tear to the vehicle and increases the rate of required maintenance, so do more miles traveled on a roadway. The following tables show the Daily Vehicle Miles Traveled on various roadways in Berks County.

The following table shows DVMT for Berks County roads by the agency that owns them from 2017 through 2021. In 2021, the county's roadways accommodated over 9.8 million miles of daily travel, the majority of which is on PennDOT owned roads. The total DVMT for Berks County increased from 2017 to 2021 by 4.29% due to various rising socioeconomic factors. A slight increase in overall county population may have helped contribute to an overall increased demand for daily vehicle miles traveled. Also, a growing economy nationwide produced an increase in demand for warehousing and the distribution of goods both within and passing through Berks County.

CHANGE IN DVMT BY AGENCY IN BERKS COUNTY FROM 2017-2021

AGENCY	2017	2018	2019	2020	2021	2017-2021 # CHANGE	2017-2021 % CHANGE
Local	1,595,815	1,567,057	1,562,558	1,264,344	1,626,303	30,488	1.91%
PennDOT	7,471,037	7,456,243	7,642,444	6,404,952	7,905,375	434,338	5.81%
Other State/ Federal	139,208	139,208	136,456	115,953	136,456	-2,752	-1.98%
Turnpike	203,259	205,971	208,230	166,906	144,808	-58,451	-28.76%
Total	9,409,320	9,368,480	9,549,688	7,934,155	9,812,942	403,623	4.29%

Source: PennDOT, Pennsylvania Highway Statistics, 2017-2021

The DVMT, broken out by functional classification, shows almost all classes of through roads increasing in use while the 51.4 miles of Interstate through Berks County decreased in use from 2017-2021.

CHANGE IN DVMT BY ROAD CLASS IN BERKS COUNTY FROM 2017-2021

	2017	2018	2019	2020	2021	2017-2021 # CHANGE	2017-2021 % CHANGE
Local	1,310,812	1,273,564	1,271,429	1,039,823	1,327,886	17,074	1.30%
Minor Collector	201,587	203,597	210,764	196,167	223,363	21,776	10.80%
Major Collector	997,990	1,016,021	1,024,488	840,931	1,045,917	47,927	4.80%
Minor Arterial	1,678,827	1,670,774	1,672,969	1,413,606	1,695,536	16,709	1.00%
Principal Arterial	1,729,579	1,740,522	1,734,500	1,435,689	1,804,699	75,120	4.34%
Interstate	1,905,287	1,831,612	1,908,946	1,577,070	1,885,969	-19,318	-1.01%
Other Freeway/ Expressway	1,585,237	1,632,390	1,726,592	1,430,869	1,829,572	244,335	15.41%
Total	9,409,320	9,368,480	9,549,688	7,934,155	9,812,942	403,623	4.29%

Source: PennDOT, Pennsylvania Highway Statistics, 2017-2021

Pavement Data

The data reported for pavement conditions is shown below. Differences in the data retrieval dates and the variations between the reported data for MAP-21, PennDOT, and this report can be seen below. The complete PennDOT Annual Report Pavements will be included in the appendix of this report.

MAP-21 Reported Road Groups (2)

- NHS
 - NHS – Interstate
 - NHS – Non-Interstate

PennDOT Reported Road Groups (4)

- NHS
 - NHS – Interstate
 - State-Owned
 - NHS – Non-Interstate
 - State-Owned
- Non-NHS
 - Non-NHS > 2,000 ADT
 - State-Owned
 - Non-NHS < 2,000 ADT
 - State-Owned

RATS Reported Road Groups (7)

- NHS
 - NHS – Interstate
 - State-Owned
 - NHS – Non-Interstate
 - State-Owned
 - LFA
 - Non-NHS
 - Non-NHS > 2,000 ADT
 - State-Owned
 - LFA
 - Non-NHS < 2,000 ADT
 - State-Owned
 - LFA

NHS Pavement Performance Measures

MAP-21 performance measures apply to all Interstate and NHS Non-Interstate miles in Pennsylvania, regardless of ownership.

Map-21 pavement performance measures required for FHWA reporting include four distress components which translate to good, fair, or poor condition scores. Three conditions apply to each pavement type. A pavement 10th mile section is considered in good condition if all three distress components are rated as good. A pavement 10th mile section is considered in poor condition if two or more of its three distress components are rated poor.

Roadway surfaces in Berks County are mostly comprised of paved surface roadways. Of the paved surface roadways, pavements are either asphalt or concrete. PennDOT assesses pavement surface conditions using a variety of metrics that include International Roughness Index (IRI). IRI measures pavement roughness in terms of the number of inches per mile that a laser, mounted in a specialized van, jumps as it is driven along a highway – the lower IRI, the smoother the ride.

MAP-21 PAVEMENT CONDITIONS AND THRESHOLDS

RATING	GOOD	FAIR	POOR
IRI (inches/mile)	<95	95-170	>170
Cracking Percentage	<5	CRCP: 5-10 Jointed: 5-15 Asphalt: 5-20	CRCP: >10 Jointed: >15 Asphalt: >20
Rutting (inches)	<0.20	0.20-0.40	>0.40
Faulting (inches)	<0.10	0.10-0.15	>0.15

FHWA requires that no more than 5% of a state’s NHS Interstate lane-miles be in poor condition but has not established a minimum condition for NHS non-Interstate roadways. PennDOT is required to establish these targets for the NHS Non-Interstate roadways. In 2021 the Map-21 Pavement Performance was captured using Total PA Lane Miles. The years prior to this were based on Total PA Miles. The tables below show the Pavement Conditions and targets for 2017 through 2021 using percentages rather than mileage due to this difference in collection type.

Map-21 Pavement Performance Pavement in Good Condition by Business Plan Network (2017-2020 Based on PA Lane Miles, 2021 Based on Total PA Lane Miles)

MAP-21 PAVEMENT PERFORMANCE MEASURE										
Business Plan Network	2017 Good %	2018 Good %	2019 Good %	2020 Good %	2021 Good %	2021 Good % Target	2022 Good % Target	2023 Good % Target	2024 Good % Target	2025 Good % Target
Interstate	63.36%	45.24%	57.56%	62.39%	59.73%	n/a	n/a	69%	67%	65%
NHS, Non-Interstate	20.32%	25.54%	30.99%	35.72%	31.31%	26%	30%	31%	30%	29%
Total NHS	33.94%	31.57%	39.61%	43.60%	39.94%	n/a	n/a	n/a	n/a	n/a

Source: Reading Performance Measures Annual Report – Pavements 2017-2021

Map-21 Pavement Performance Pavement in Poor Condition by Business Plan Network (2017-2020 Based on PA Lane Miles, 2021 Based on Total PA Lane Miles)

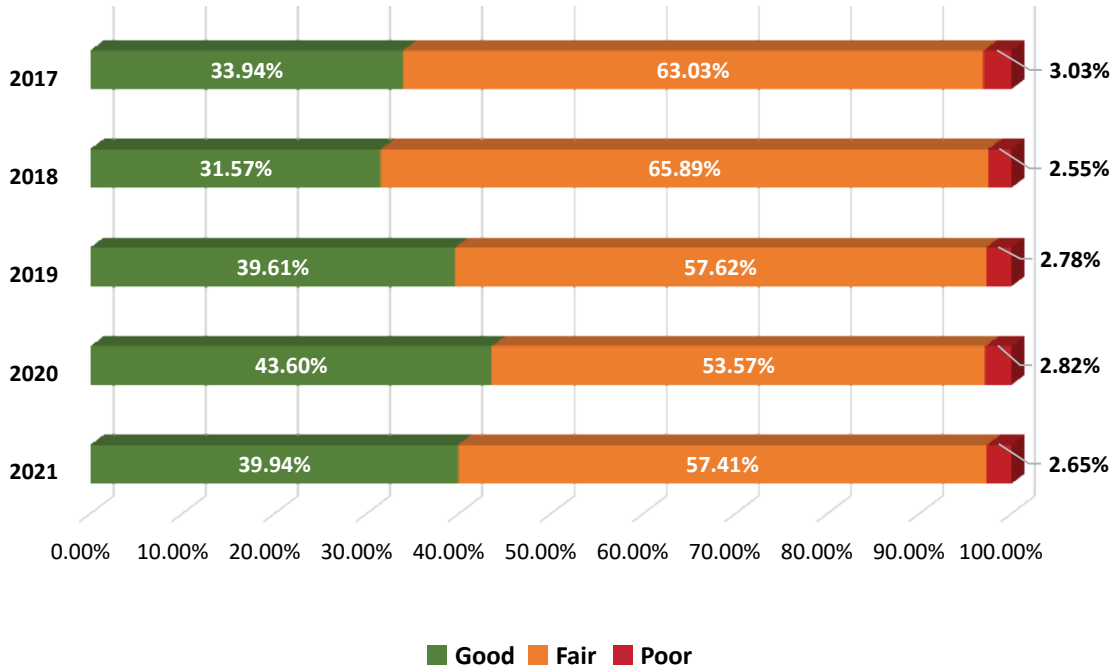
MAP-21 PAVEMENT PERFORMANCE MEASURE										
Business Plan Network	2017 Poor %	2018 Poor %	2019 Poor %	2020 Poor %	2021 Poor %	2021 Poor % Target	2022 Poor % Target	2023 Poor % Target	2024 Poor % Target	2025 Poor % Target
Interstate	0.11%	0.17%	0.23%	0.30%	0.14%	n/a	n/a	2%	2%	2%
NHS, Non-Interstate	4.37%	3.63%	4.00%	3.90%	3.75%	5%	6%	6%	6%	6.5%
TOTAL NHS	3.03%	2.55%	2.78%	2.82%	2.65%	N/A	N/A	N/A	N/A	N/A

Source: Reading Performance Measures Annual Report – Pavements 2017-2021

Analyzing the two tables above, Good Condition Lane Miles on the NHS have varied over the years, however the NHS, Non-Interstate has already met targets through 2025, as long as Good Condition % is maintained on this system. The Good Condition % on the Interstate is higher than NHS Non-Interstate, however, needs to increase to meet the performance measure target in 2024. Poor Condition Lane Miles on the NHS have remained low, consistently meeting performance measure targets and on track to continue this trend.

To view the pavement condition changes on the NHS system over the years, the following chart has been created including fair condition.

Total NHS Pavement Conditions for 2017-2021 Based on MAP-21 Pavement Performance Measures

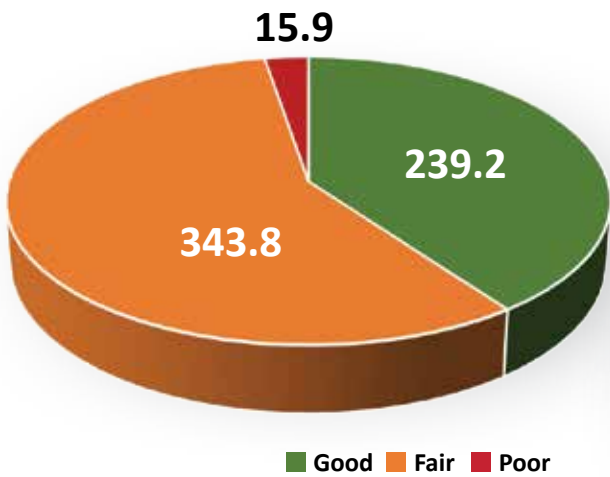


Source: Reading Performance Measures Annual Report – Pavements 2017-2021

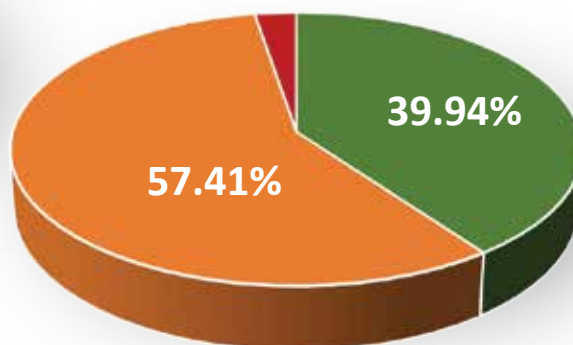
The pavement performance is shown in the following pie charts for 2021.

MAP-21 NHS PAVEMENT PERFORMANCE 2021

By Total PA Lane Miles



By %





This picture shows improvements made to the roadway surface of SR 222 in Maiden creek and Ontelaunee Townships, reducing the Lane Miles of Poor IRI on the NHS.

BERKS COUNTY PAVEMENT CONDITION SCORECARD BASED ON MAP-21 PAVEMENT PERFORMANCE MEASURES (Based on Total PA Lane Miles)

INDICATOR	DESCRIPTION	TREND	TREND
Interstate Pavement in Good Condition	In 2021, 59.73% of Interstate Pavement was in Good Condition. This value has ranged from 45.24% to 63.36% over the last 5 years, however, needs to improve to meet 2023-2025 Targets, which range from 65% to 69%.	<p style="text-align: center;">STEADY</p>	
Interstate Pavement in Poor Condition	In 2021, 0.14% of Interstate Pavement was in Poor Condition. This value has ranged from 0.11% to 0.30% over the last 5 years, and is on track to remain well below the upcoming 2% Targets.	<p style="text-align: center;">STEADY</p>	
Non-Interstate NHS Pavement in Good Condition	In 2021, 31.31% of Non-Interstate, NHS Pavement was in Good Condition. This value has improved from 20.32% in 2017, however, will need to remain steady as the 2022-2025 Targets range from 29%-31%.	<p style="text-align: center;">IMPROVING</p>	
Non-Interstate NHS Pavement in Poor Condition	In 2021, 3.75% of Non-Interstate, NHS Pavement was in Poor Condition. This value has ranged from 4.37% to 3.63% over the last 5 years, and is on track to remain below the 2022-2025 Targets, which range from 6% to 6.5%.	<p style="text-align: center;">STEADY</p>	

NHS, State, and Local Pavement Smoothness (IRI) Summaries

PennDOT analyzes this same information based on PennDOT Segment Miles as opposed to Total PA Lane Miles. The IRI Ranking Categories also range from Excellent to Poor as opposed to Good to Poor, these categories are shown in the table below.

IRI CATEGORIES	INTERSTATE	NHS NON-INTERSTATE	NON-NHS \geq 2,000 ADT	NON-NHS < 2,000 ADT
≤ 70	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
71-75	GOOD	EXCELLENT	EXCELLENT	EXCELLENT
76-100		GOOD	EXCELLENT	EXCELLENT
101-120	FAIR	GOOD	GOOD	EXCELLENT
121-150		FAIR	GOOD	GOOD
151-170	POOR	FAIR	FAIR	GOOD
171-195		POOR	FAIR	FAIR
196-220		POOR	POOR	FAIR
>220			POOR	POOR

Source: PennDOT Roadway Management and Testing

In addition to the Interstate and NHS Non-Interstate, data is gathered for Non-NHS \geq 2,000 ADT and Non-NHS < 2,000 ADT. To separate these categories further, RATS will break out the NHS-Non-Interstate, Non-NHS \geq 2,000 ADT, and Non-NHS < 2,000 ADT by State-Owned and LFA segment miles as shown in the table below. State-Owned and LFA data for 2021 was gathered August 10, 2022.

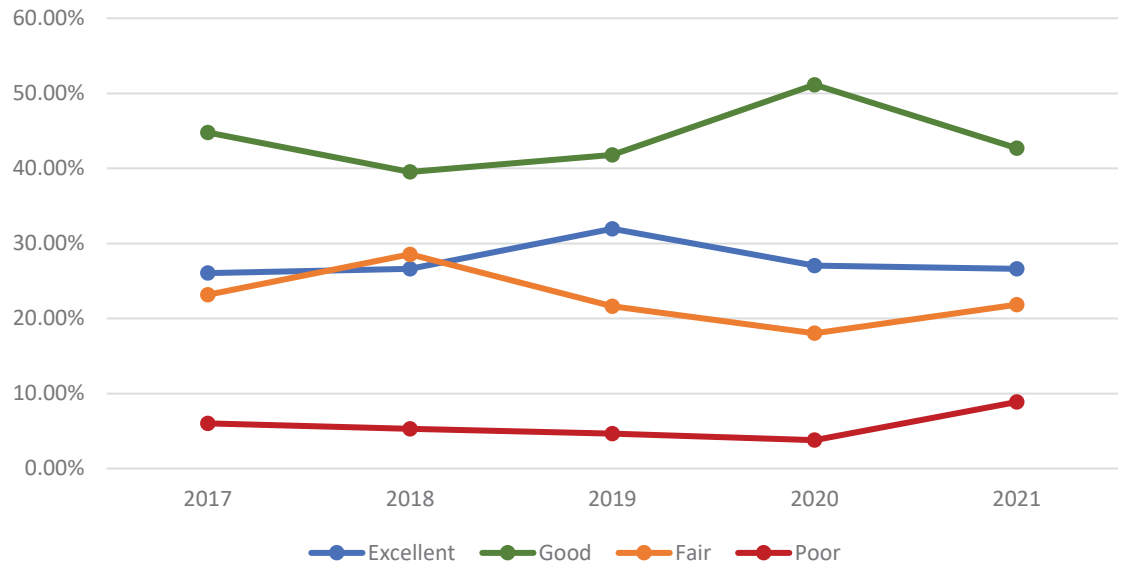
2021 Pavement IRI Summary by Business Plan Network (Based on PennDOT Segment Miles)

BUSINESS PLAN NETWORK	EXCELLENT		GOOD		FAIR		POOR		TOTAL Tested Seg Mi
	Seg Mi	%	Seg Mi	%	Seg Mi	%	Seg Mi	%	
Interstate	24.8	26.60%	39.8	42.68%	20.4	21.85%	8.3	8.87%	93.3
TOTAL NHS NON-INTERSTATE	28.3	13.80%	83.1	40.55%	57.8	28.21%	35.7	17.45%	204.9
State-Owned	0	0.00%	8.4	29.47%	11.1	38.95%	9.0	31.58%	28.5
LFA	29.6	16.36%	77.0	42.56%	45.7	25.26%	28.6	15.81%	180.9
TOTAL NON-NHS \geq 2,000 ADT	60.5	16.97%	185.4	51.97%	71.5	20.05%	39.3	11.02%	356.7
State-Owned	35.2	12.69%	138.0	49.77%	64.3	23.19%	39.8	14.35%	277.3
LFA	24.8	26.35%	50.4	53.56%	12.5	13.28%	6.4	6.80%	94.1
TOTAL NON-NHS < 2,000 ADT	26.7	7.91%	120.1	35.60%	132.8	39.38%	57.7	17.11%	337.3
State-Owned	28.2	8.62%	116.9	35.74%	125.8	38.46%	56.2	17.18%	327.1
LFA	0	0.00%	0.8	8.89%	3.6	40.00%	4.6	51.11%	9.0

Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT's Roadway Management System (RMS) Road Segments RMSSEG: 12/31/2021, State-Owned and LFA data date: 8/10/2022

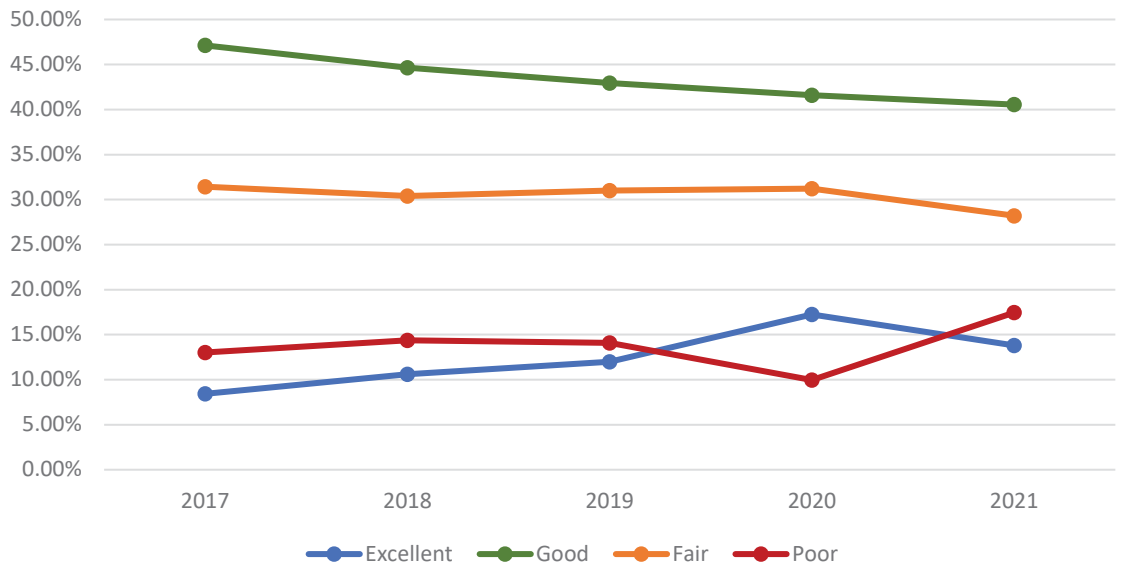
The following charts show IRI trends from 2017-2021 on all levels of the Business Plan Network.

Interstate IRI Trends 2017-2021



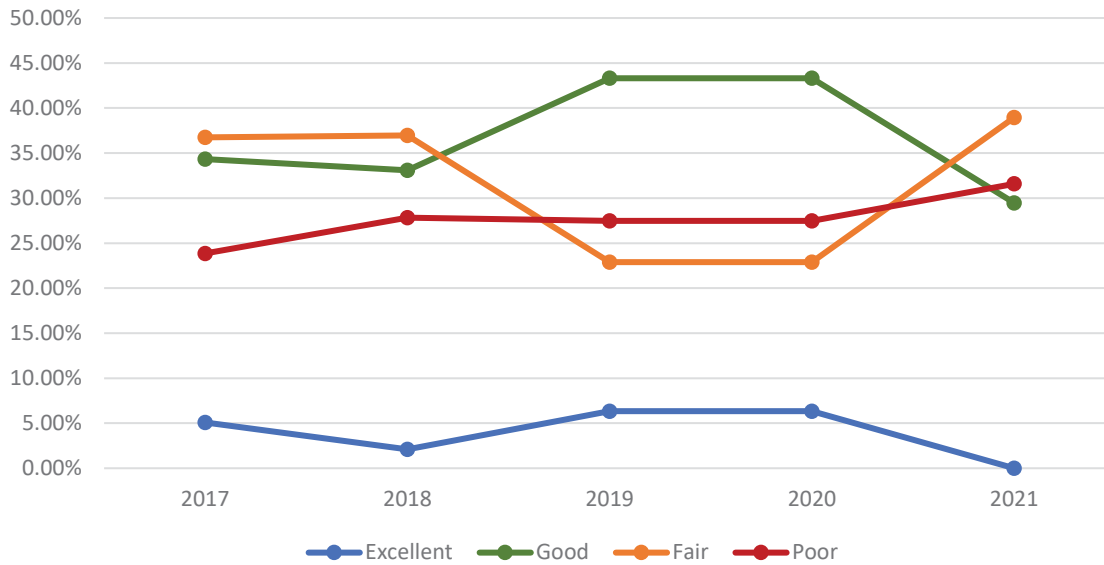
Source: Reading Performance Measures Annual Report – Pavements 2017-2021

Total NHS Non-Interstate IRI Trends 2017-2021



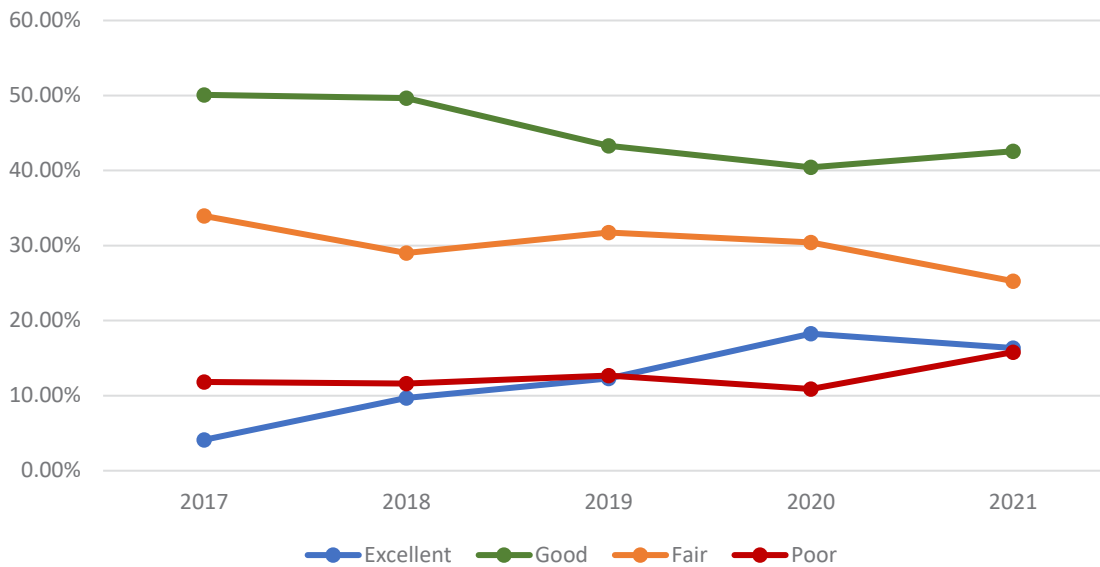
Source: Reading Performance Measures Annual Report – Pavements 2017-2021

NHS Non-Interstate State-Owned IRI Trends 2017-2021



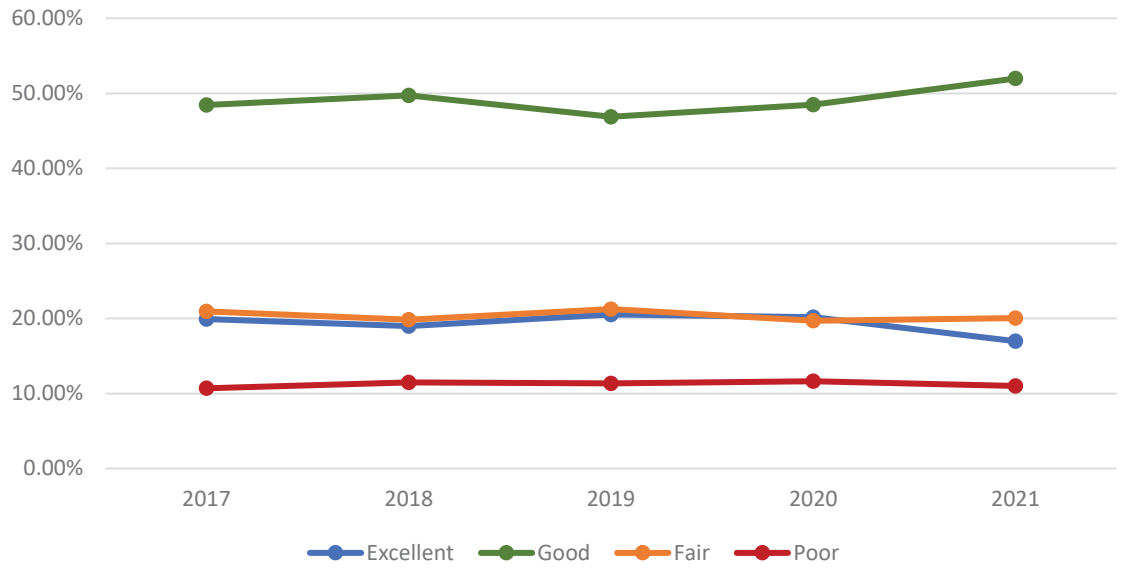
Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT’s Roadway Management System (RMS) Road Segments RMSSEG: 7/18/2017, 11/19/2018, 2/6/2020, 9/22/2020, 8/10/2022

NHS Non-Interstate LFA IRI Trends 2017-2021



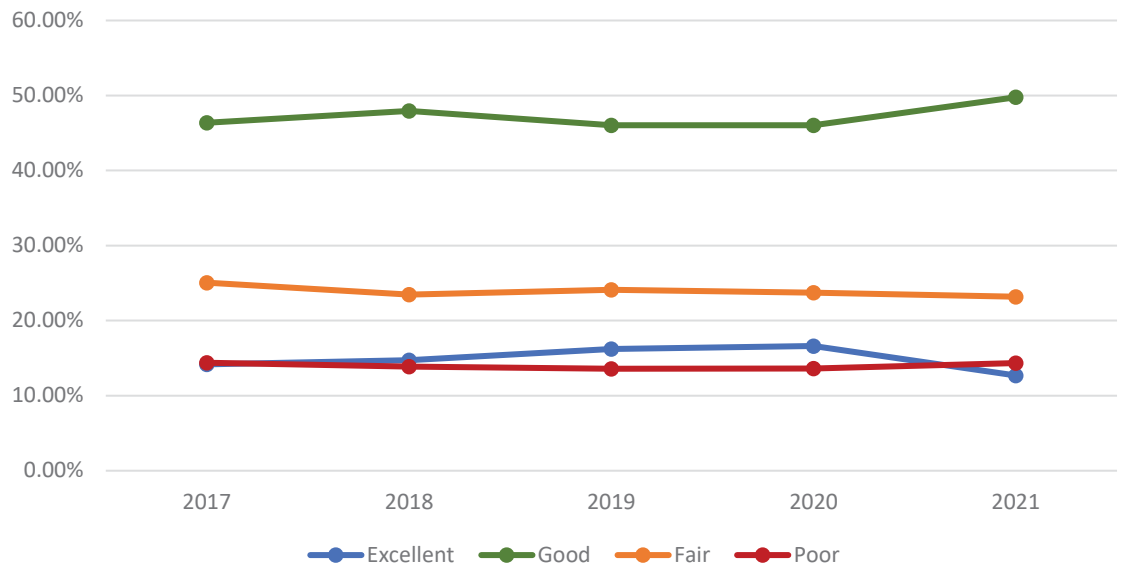
Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT’s Roadway Management System (RMS) Road Segments RMSSEG: 7/18/2017, 11/19/2018, 2/6/2020, 9/22/2020, 8/10/2022

Total Non-NHS \geq 2,000 ADT IRI Trends 2017-2021



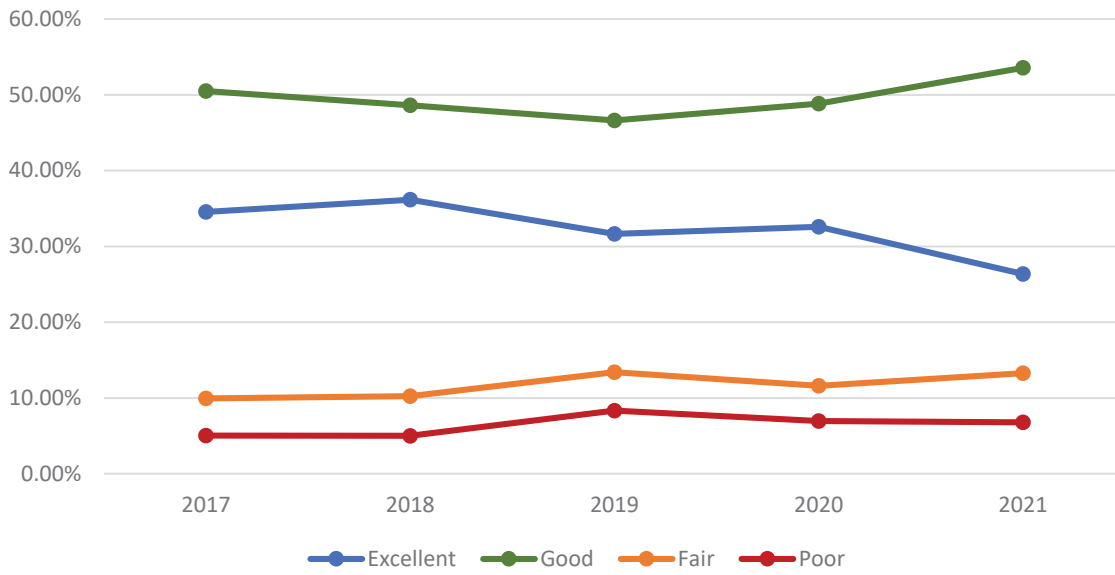
Source: Reading Performance Measures Annual Report – Pavements 2017-2021

Non-NHS \geq 2,000 ADT State-Owned IRI Trends 2017-2021



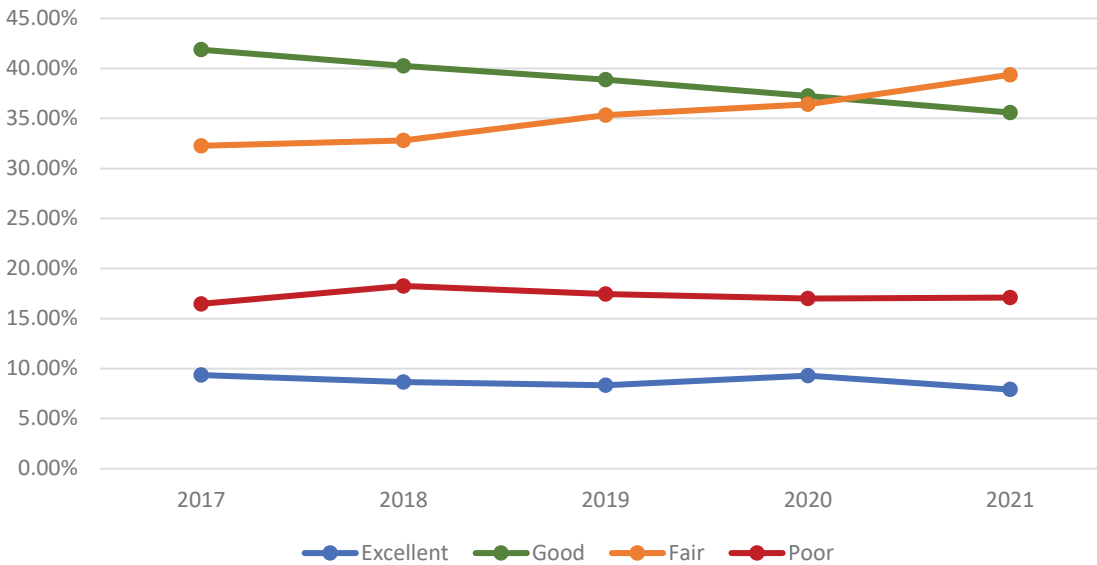
Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT's Roadway Management System (RMS) Road Segments RMSSEG: 7/18/2017, 11/19/2018, 2/6/2020, 9/22/2020, 8/10/2022

Non-NHS \geq 2,000 ADT LFA IRI Trends 2017-2021



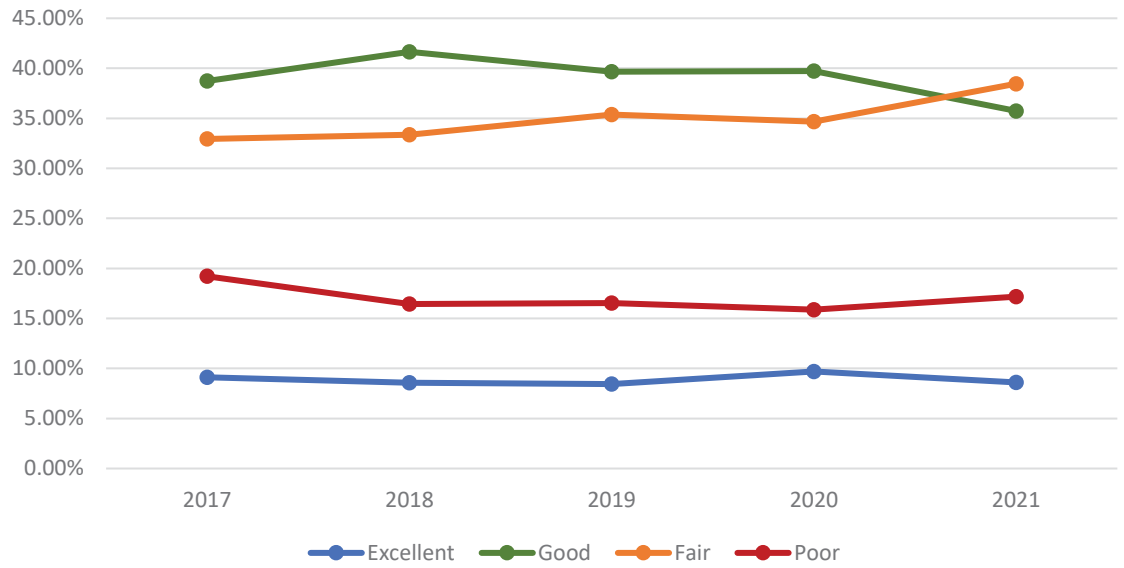
Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT's Roadway Management System (RMS) Road Segments RMSSEG: 7/18/2017, 11/19/2018, 2/6/2020, 9/22/2020, 8/10/2022

Total Non-NHS < 2,000 ADT IRI Trends 2017-2021



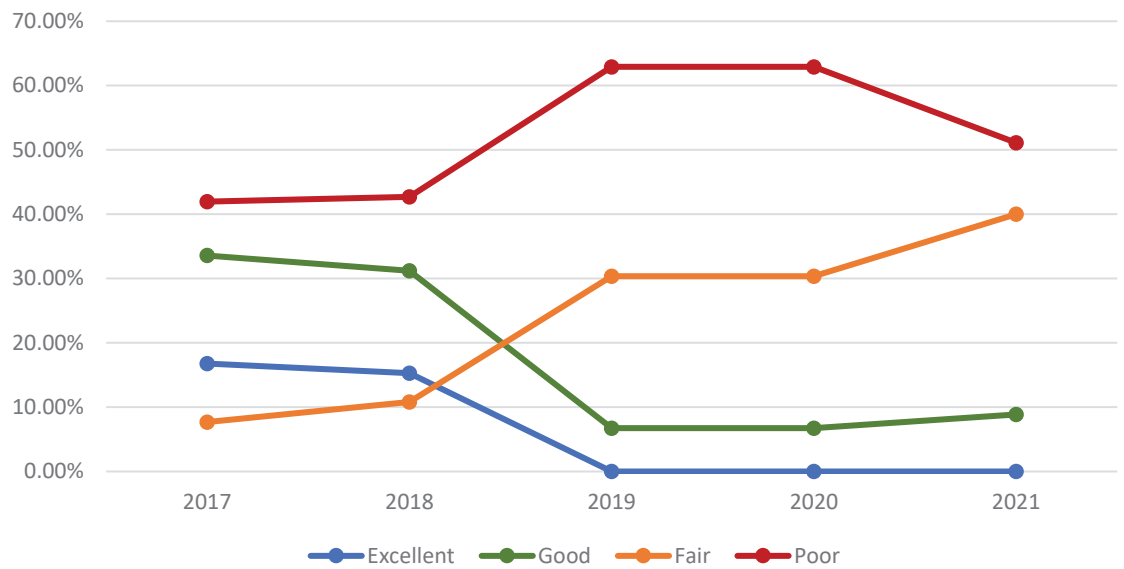
Source: Reading Performance Measures Annual Report – Pavements 2017-2021

Non-NHS < 2,000 ADT State-Owned IRI Trends 2017-2021



Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT’s Roadway Management System (RMS) Road Segments RMSSEG: 7/18/2017, 11/19/2018, 2/6/2020, 9/22/2020, 8/10/2022

Non-NHS < 2,000 ADT LFA IRI Trends 2017-2021



Source: Reading Performance Measures Annual Report – Pavements 2017-2021 and PennDOT’s Roadway Management System (RMS) Road Segments RMSSEG: 7/18/2017, 11/19/2018, 2/6/2020, 9/22/2020, 8/10/2022

SECTION 3

BRIDGES

Bridge Background and Data

The Schuylkill River, two lakes and countless streams provide ample recreational and commercial activities, but create a transportation challenge to safely and efficiently move people and freight over them in Berks County. In 2021, there are 875 bridges in Berks County, with the majority owned by PennDOT. These bridges are those that require inspections – state bridges longer than 8 feet and local bridges longer than 20 feet. Since 2017, the total number of bridges decreased from 883 to 881, with fewer bridges owned and maintained locally. Berks County is responsible for 54 of the 236 local bridges. The change in total number of bridges is in part due to PennDOT efforts to improve the classification of bridges.

BRIDGE NUMBERS IN BERKS COUNTY FROM 2017-2021

BRIDGE TYPE	2017	2018	2019	2020	2021	# CHANGE	% CHANGE
State \geq 8'; Interstate/Ramps	64	64	64	65	64	0	0.00%
State \geq 8'; NHS (non-Interstate)	150	150	150	150	151	1	0.66%
State \geq 8'; non-NHS > 2000 ADT	237	234	252	239	236	-1	0.42%
State \geq 8'; non-NHS < 2000 ADT	191	189	181	191	194	3	1.57%
Local \geq 20'	242	240	236	236	236	-6	-2.48%
TOTAL BRIDGES	883	877	883	881	881	-3	-0.34%

Source: PennDOT Performance Measures Annual Reports, Reading MPO, 2017-2021

As Berks County bridges continue to age and deteriorate, it is sometimes necessary to close bridges unexpectedly due to problems revealed during routine inspections. Bridges closed to traffic are those structures deemed unsafe to carry any type of traffic. The number of bridges closed to traffic in the county decreased 11.11% since 2017. As of 2021, 8 bridges are closed, with the majority being bridges owned locally.

CLOSED BRIDGES IN BERKS COUNTY FROM 2017-2021

BRIDGE TYPE	2017	2018	2019	2020	2021	# CHANGE	% CHANGE
State \geq 8'; Interstate/Ramps	0	0	0	0	0	0	0.00%
State \geq 8'; NHS (non-Interstate)	0	0	0	0	0	0	0.00%
State \geq 8'; non-NHS > 2000 ADT	0	0	0	0	0	0	0.00%
State \geq 8'; non-NHS < 2000 ADT	3	3	3	1	2	-1	-33.33%
Local \geq 20'	6	7	7	6	6	0	0.00%
TOTAL CLOSED BRIDGES	9	10	10	7	8	-1	-11.11%

Source: PennDOT Performance Measures Annual Reports, Reading MPO, 2017-2021

Load posting a bridge is required by the National Bridge Inspection Standards when a bridge is not capable of safely carrying a legal load. If a bridge is deemed deficient, officials will post a maximum load for the bridge. Bridges may also be posted for other load capacity restrictions including speed and number of vehicles permitted on the bridge. 75 bridges are posted in Berks County as of 2021, with the majority of those bridges owned locally. The number of posted bridges decreased 16.67% since 2017.

POSTED BRIDGES IN BERKS COUNTY FROM 2017-2021							
BRIDGE TYPE	2017	2018	2019	2020	2021	# CHANGE	% CHANGE
State ≥ 8'; Interstate/Ramps	0	0	0	2	2	2	200.00%
State ≥ 8'; NHS (non-Interstate)	2	2	2	1	1	-1	-50.00%
State ≥ 8'; non-NHS > 2000 ADT	9	6	6	6	2	-7	-77.78%
State ≥ 8'; non-NHS < 2000 ADT	11	10	9	8	10	-1	-9.10%
Local ≥ 20'	68	62	58	61	60	-8	-11.76%
TOTAL POSTED BRIDGES	90	80	75	78	75	-15	-16.67%

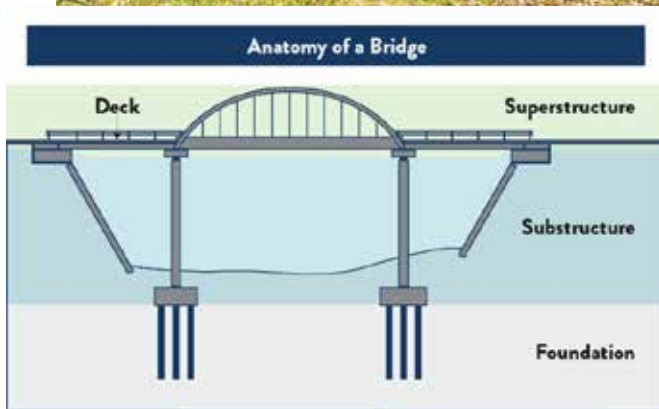
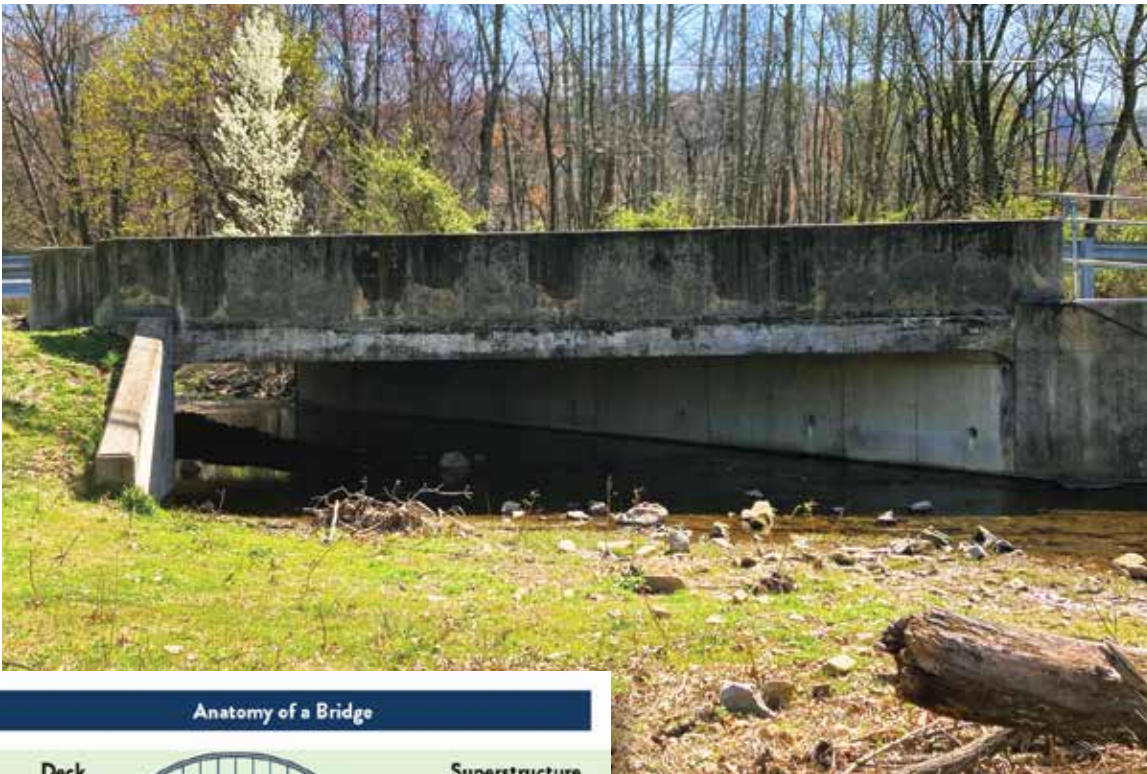
Source: PennDOT Performance Measures Annual Reports, Reading MPO, 2017-2021

Bridge Inspection Overview

Bridges are characterized by the condition of their major components. State-owned bridges 8 feet in length or more and local-owned bridges over 20 feet in length are inspected on a regular, rotating basis. These inspections result in condition ratings for the deck, substructure, and superstructure. If the bridge is a culvert, then the one structural piece is given a condition rating. If any one of these structural parts has a condition rating of 4 or less, that bridge is deemed Poor. Bridges and culverts with a condition rating of 5 for any of the structural parts are considered Fair. Bridges and culverts with a condition rating of 6 or higher are considered Good. Each of these components is rated based on the Federal Highway Administration's Pavement and Bridge Condition Report Performance Measures final rule, which became effective in February 2017.

A Poor designation does not imply that a bridge is unsafe. However, such bridges typically require significant maintenance and repair to remain in service and would eventually require major rehabilitation or replacement to address the underlying deficiency. Some examples of underlying deficiencies can include inadequate under-clearances, insufficient load-carrying capacity, poor alignment with the roadway, or can no longer adequately service today's traffic.

Berks County bridge conditions will be explored in the following sections.



This graphic shows the locations of a bridge substructure, superstructure, and deck, which are all considered in the overall condition rating. The picture above is an example of a frame culvert in Muhlenberg Township. Since this type of bridge is one structural piece, it receives one condition rating.

Bridge Data

The data reported for Bridge conditions is shown below. Differences in the data retrieval dates and the variations between the reported data for MAP-21, PennDOT, and this report can be seen below. The complete PennDOT Annual Report Bridges will be at the end of this report.

MAP-21 Reported Bridge Groups (2)

- NHS
 - NHS – Interstate
 - NHS – Non-Interstate

PennDOT Reported Bridge Groups (5)

- NHS
 - NHS – Interstate/Ramps
 - State-Owned $\geq 8'$
 - NHS – Non-Interstate
 - State-Owned $\geq 8'$
- Non-NHS
 - Non-NHS $\geq 2,000$ ADT
 - State-Owned $\geq 8'$
 - Non-NHS $< 2,000$ ADT
 - State-Owned $> 8'$
 - Local $\geq 20'$

RATS Reported Bridge Groups (8)

- NHS
 - NHS – Interstate/Ramps
 - State-Owned $\geq 8'$
 - NHS – Non-Interstate
 - State-Owned $\geq 8'$
- Non-NHS
 - Non-NHS $\geq 2,000$ ADT
 - State-Owned $\geq 8'$
 - Non-NHS $\leq 2,000$ ADT
 - State-Owned $\geq 8'$
 - Local $\geq 20'$
 - County $\geq 20'$
 - Township $\geq 20'$
 - Borough/City $\geq 20'$
 - Railroad $\geq 20'$

NHS Bridge Performance Measures

Both this report and PennDOT's Annual Report – Bridges measure bridges in Berks County by the percentage of poor deck area, count percentage of poor bridges, and count percentage of good bridges. Map-21 bridge performance measures required for FHWA reporting include good, fair, or poor condition scores for each bridge and applies to all Interstate and NHS Non-Interstate bridges 20' or greater. The complete PennDOT Annual Report – Bridges will be at the end of this section.

Map-21 performance measures apply to all Interstate and NHS Non-Interstate bridges in Pennsylvania regardless of ownership. Therefore, PA Turnpike and local-owned bridges are included in the totals on the table below. This Bridge Performance Measure has met the 2021 and 2023 targets and the percentage of Poor Deck Area has continued decreasing. FHWA requires that no more than 10% of a State's total NHS Bridge Deck Area be in Poor Condition.

MAP-21 BRIDGE PERFORMANCE POOR CONDITION DECK AREA BY BUSINESS PLAN NETWORK (BASED ON ALL NHS BRIDGES GREATER THAN OR EQUAL TO 20' IN LENGTH)

MAP-21 BRIDGE PERFORMANCE MEASURE									
Business Plan Network	2017 Poor Deck Area %	2018 Poor Deck Area %	2019 Poor Deck Area %	2019 Target	2020 Poor Deck Area %	2021 Poor Deck Area %	2021 Target	2023 Target	2025 Target
Interstate	34.66%	34.66%	33.27%	n/a	32.64%	33.27%	n/a	n/a	n/a
NHS, Non-Interstate	15.05%	15.05%	14.91%	n/a	7.28%	7.23%	n/a	n/a	n/a
Total NHS	19.33%	19.33%	18.91%	18.00%	12.96%	12.93%	16.00%	14.00%	13.00%

Source: Reading Performance Measures Annual Report – Bridges 2017-2021

MAP-21 BRIDGE PERFORMANCE PERCENTAGE OF POOR CONDITION BRIDGES BY BUSINESS PLAN NETWORK (BASED ON ALL NHS BRIDGES GREATER THAN OR EQUAL TO 20' IN LENGTH)

MAP-21 BRIDGE PERFORMANCE MEASURE							
Business Plan Network	2017 Poor Count %	2018 Poor Count %	2019 Poor Count %	2020 Poor Count %	2021 Poor Count %	2023 Target	2025 Target
Interstate	11.90%	11.90%	9.52%	9.30%	9.52%	n/a	n/a
NHS, Non-Interstate	6.67%	6.67%	5.83%	4.17%	4.13%	n/a	n/a
Total NHS	8.02%	8.02%	6.79%	5.52%	5.52%	7.50%	7.50%

Source: Reading Performance Measures Annual Report – Bridges 2017-2021

MAP-21 BRIDGE PERFORMANCE PERCENTAGE OF GOOD CONDITION BRIDGES BY BUSINESS PLAN NETWORK

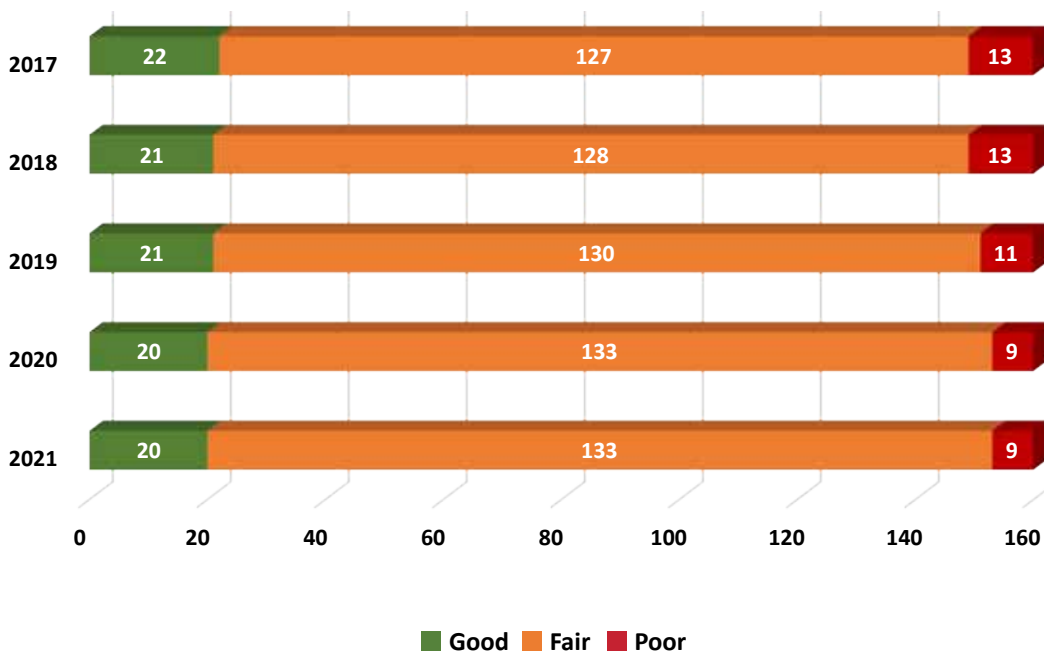
(BASED ON ALL NHS BRIDGES GREATER THAN OR EQUAL TO 20' IN LENGTH)

MAP-21 BRIDGE PERFORMANCE MEASURE							
Business Plan Network	2017 Good Count %	2018 Good Count %	2019 Good Count %	2020 Good Count %	2021 Good Count %	2023 Target	2025 Target
Interstate	11.90%	11.90%	11.90%	11.63%	11.90%	n/a	n/a
NHS, Non-Interstate	14.17%	13.33%	13.33%	12.50%	12.40%	n/a	n/a
Total NHS	13.58%	12.96%	12.96%	12.27%	12.27%	28.00%	28.00%

Source: Reading Performance Measures Annual Report – Bridges 2017-2021

To further analyze the NHS bridge conditions, the following stacked bar chart shows the number of Good, Fair, and Poor bridges over the last 5 years for all NHS bridges greater than or equal to 20' in length. Good Condition NHS bridges decreased from 22 to 20, Fair Condition NHS bridges increased from 127 to 133, and Poor Condition NHS bridges decreased from 13 to 9.

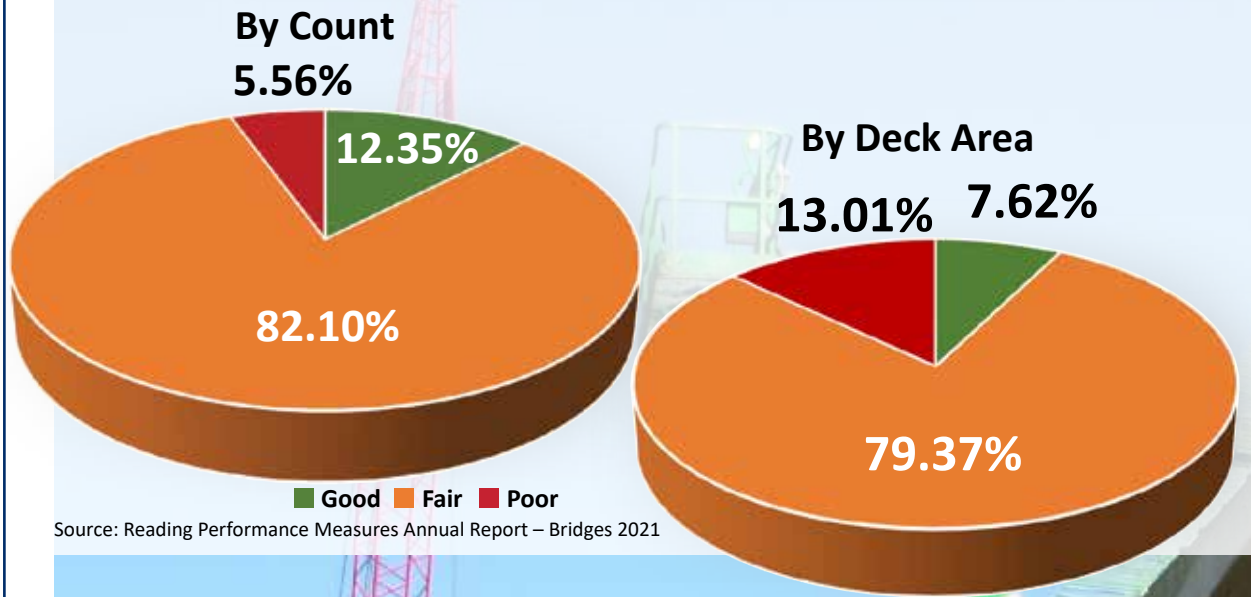
NHS Bridges Greater than or Equal to 20' in Length Conditions for 2017-2021



Source: Reading Performance Measures Annual Report – Bridges 2017-2021

The bridge performance is shown in the following pie charts for 2021.

MAP-21 BRIDGE PERFORMANCE 2021 (BASED ON ALL NHS BRIDGES GREATER THAN OR EQUAL TO 20' IN LENGTH)

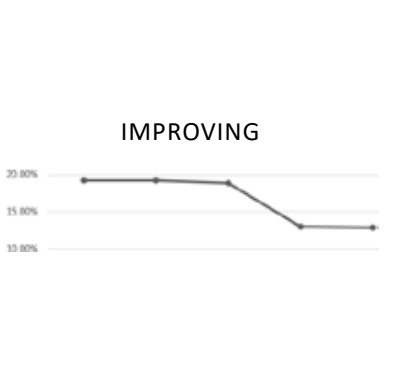



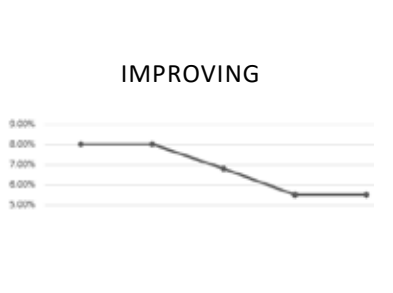



Source: Reading Performance Measures Annual Report – Bridges 2021



Construction on the Interstate 78 bridge in Tilden Township and Hamburg Borough continues which will improve not only the NHS bridge, but the associated pavement IRI.

BERKS COUNTY BRIDGE CONDITION SCORECARD BASED ON MAP-21 BRIDGE PERFORMANCE MEASURES (BASED ON TOTAL PA LANE MILES)

INDICATOR	DESCRIPTION	TREND	TREND
NHS Bridge Deck Area in Poor Condition	In 2021, 12.93% of the NHS Bridge Deck Area was in Poor Condition. This value has improved by 6.4% over the last 5 years, and is on track to meet the set Targets through 2023, however, needs to improve to meet the 2025 Target and should continue improving to meet the overall statewide 10% target set by FHWA.	IMPROVING 	
Bridges in Good Condition	In 2021, 12.27% of NHS Bridges were in Good Condition. This is a slight decline from the 13.58% in 2017, however, this number needs to greatly improve to meet the 2023 and 2025 Targets, which are set at 28%.	STEADY 	
NHS Bridges in Poor Condition	In 2021, 5.52% of NHS Bridges were in Poor Condition. This is an improvement from the 8.02% in 2017, and meets the 7.5% Targets set for 2023 and 2025.	IMPROVING 	

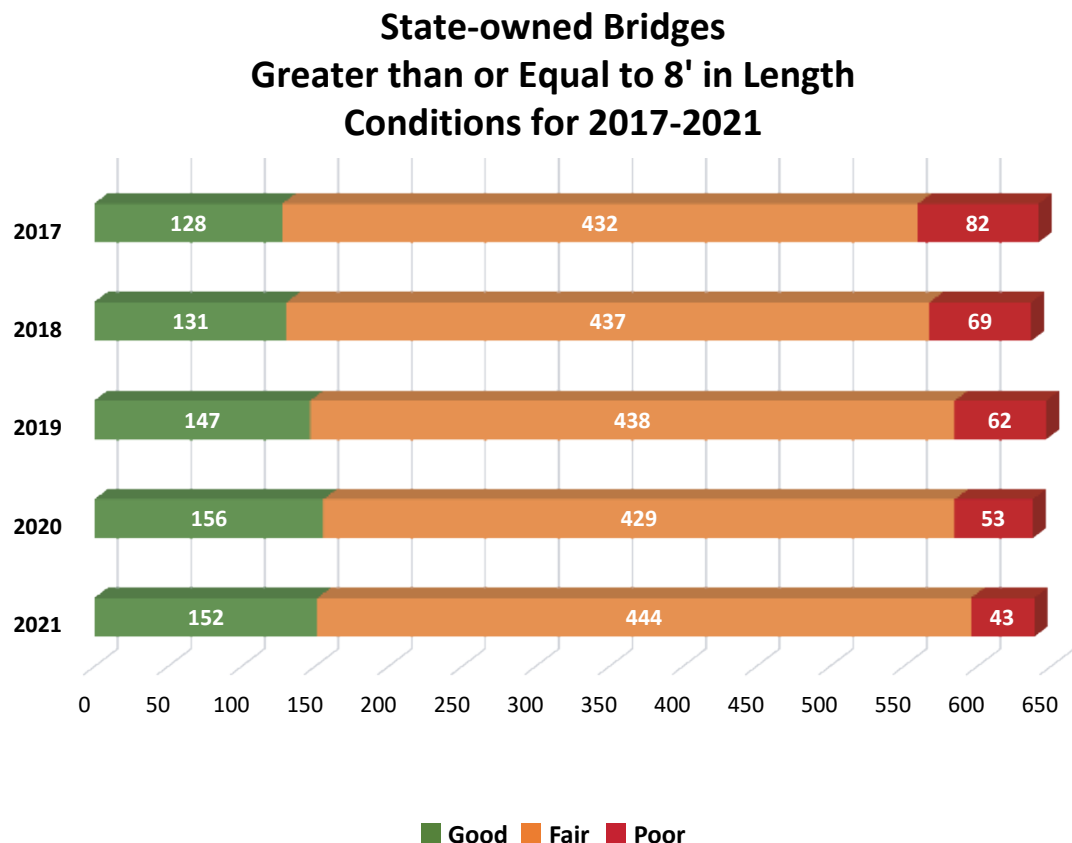
State-owned Bridge Conditions

Beyond the condition ratings gathered and analyzed for the MAP-21 Performance Measures, PennDOT reports on the state-owned bridges 8 feet in length or more and local-owned bridges over 20 feet in length. The following charts look at the conditions for state-owned bridges greater than or equal to 8 feet in length.

STATE-OWNED POOR BRIDGES \geq 8' BY DECK AREA					
Business Plan Network	2017 Poor Deck Area %	2018 Poor Deck Area %	2019 Poor Deck Area %	2020 Poor Deck Area %	2021 Poor Deck Area %
State \geq 8'; Interstate/Ramps	36.68%	37.19%	35.73%	34.50%	35.21%
State \geq 8'; NHS (non-Interstate)	14.86%	14.86%	14.72%	7.22%	7.16%
State \geq 8'; non-NHS > 2000 ADT	12.34%	10.29%	6.23%	5.79%	4.36%
State \geq 8'; non-NHS < 2000 ADT	19.34%	15.93%	12.21%	9.70%	7.89%
Total State Bridges \geq 8'	17.63%	16.81%	14.97%	10.80%	10.24%

Source: Reading Performance Measures Annual Report – Bridges 2017-2021

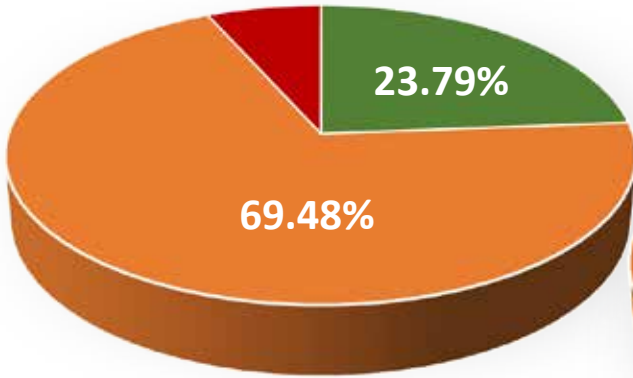
To further analyze the State-owned bridge conditions, the chart below shows the number of Good, Fair, and Poor bridges over the last 5 years for all State-owned bridges greater than or equal to 8' in length.



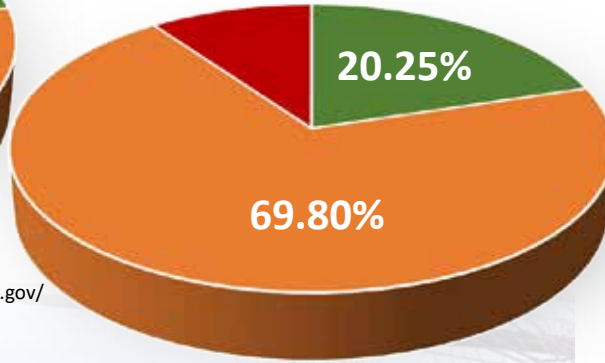
Source: PennDOT Bridge Conditions State Excel Files gis.penndot.gov/paprojects/BridgeConditions.aspx 9/15/2017, 11/19/2018, 2/06/2020, 8/26/2020, 12/08/2022

2021 \geq 8' STATE-OWNED BRIDGE CONDITIONS

By Count
6.73%



By Deck Area
9.95%



Source: PennDOT Bridge Conditions State Excel Files gis.penndot.gov/paprojects/BridgeConditions.aspx 12/08/2022



This state-owned, poor condition bridge in Albany Township over a tributary to the Maiden Creek is under construction in April 2023 and will decrease the number of poor condition bridges and deck area in Berks County when completed.

Local-owned Bridge Conditions

Local-owned bridges consist of county, township, borough/city, and railroad owned bridges.

2021 LOCAL-OWNED BRIDGES \geq 20' CONDITIONS BY COUNT BY BUSINESS PLAN NETWORK

BUSINESS PLAN NETWORK	GOOD		FAIR		POOR		TOTAL
	#	%	#	%	#	%	#
Local \geq 20'	35	14.83%	130	55.08%	71	30.08%	236
County	14	25.93%	22	40.74%	18	33.33%	54
Township	18	11.46%	95	60.51%	44	28.03%	157
Borough/City	2	9.09%	13	59.09%	7	31.82%	22
Railroad	1	33.33%	0	0.00%	2	66.66%	3

Source: PennDOT Bridge Conditions Local Excel Files gis.penndot.gov/paprojects/BridgeConditions.aspx 12/08/2022

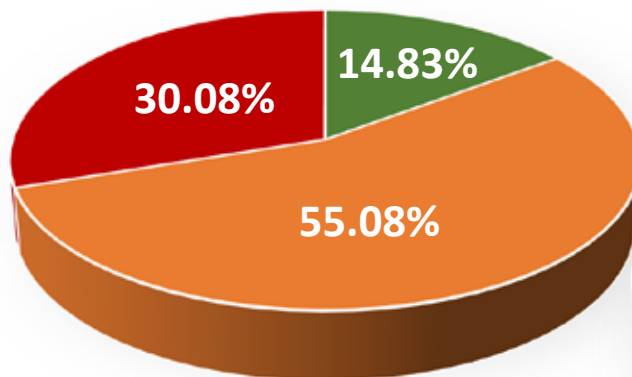
2021 LOCAL-OWNED BRIDGES \geq 20' CONDITIONS BY DECK AREA BY BUSINESS PLAN NETWORK

BUSINESS PLAN NETWORK	GOOD		FAIR		POOR		TOTAL
	Deck Area SF	%	Deck Area SF	%	Deck Area SF	%	Deck Area SF
Local > 20'	81,572.8	17.91%	242,340.8	53.21%	131,560.2	28.88%	455,473.8
County	44,427.7	25.46%	92,343.6	52.93%	37,696.4	21.61%	174,467.7
Township	31,277.0	15.33%	101,062.2	49.54%	71,658.2	35.13%	203,997.4
Borough/City	3,338.5	4.98%	48,935.0	72.98%	14,782.0	22.04%	67,055.5
Railroad	2,529.6	25.41%	0.0	0.00%	7,423.6	74.59%	9,953.2

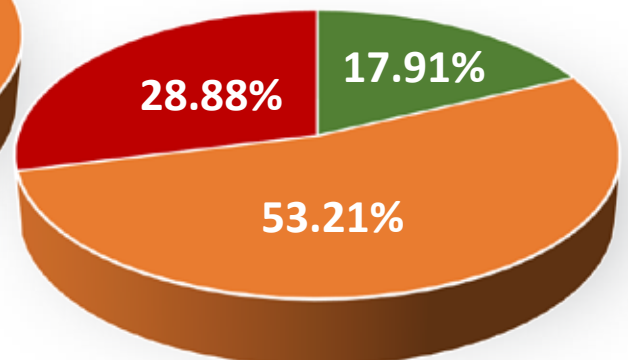
Source: PennDOT Bridge Conditions Local Excel Files gis.penndot.gov/paprojects/BridgeConditions.aspx 12/08/2022

2021 LOCAL-OWNED BRIDGES \geq 20' IN LENGTH

By Count



By Deck Area





The Glendale Bridge on Winding Road over the Ironstone Creek in Douglass Township is a County owned bridge built in 1906. This bridge project was funded using proceeds from the Act 89 "Fee for Local Use Fund".

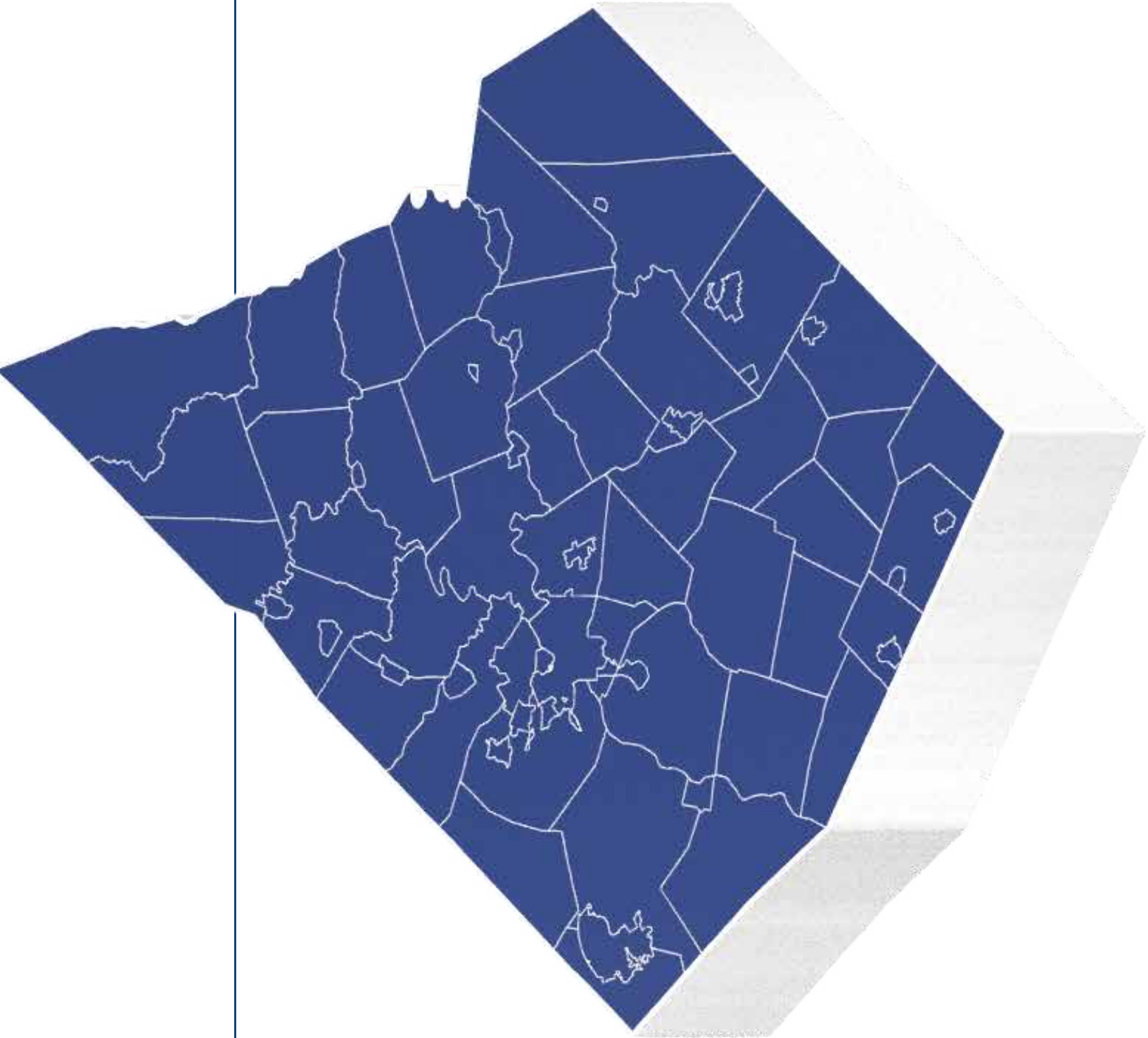


Rehabilitation/replacement finished on this bridge in 2022.

SECTION 4

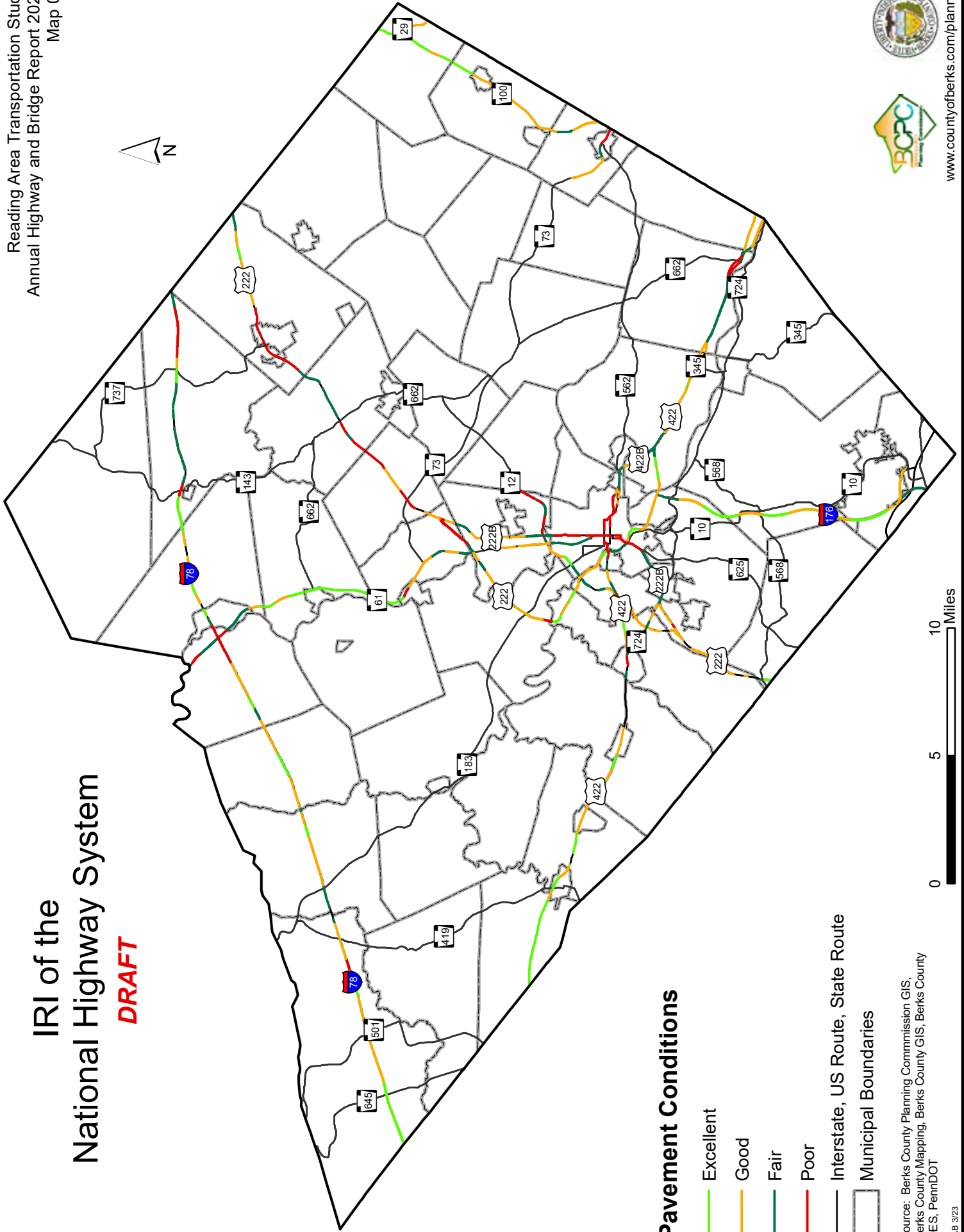
PAVEMENT CONDITION AND BRIDGE CONDITIONS MAPS BY PLANNING REGION

The following series of maps shows pavement and bridge conditions by planning region. The Berks County Planning Commission used this effective approach to display information in a local, easily understandable format in the current Comprehensive Plan.



IRI of the National Highway System

DRAFT



Pavement Conditions

- Excellent
- Good
- Fair
- Poor

- Interstate, US Route, State Route
- Municipal Boundaries

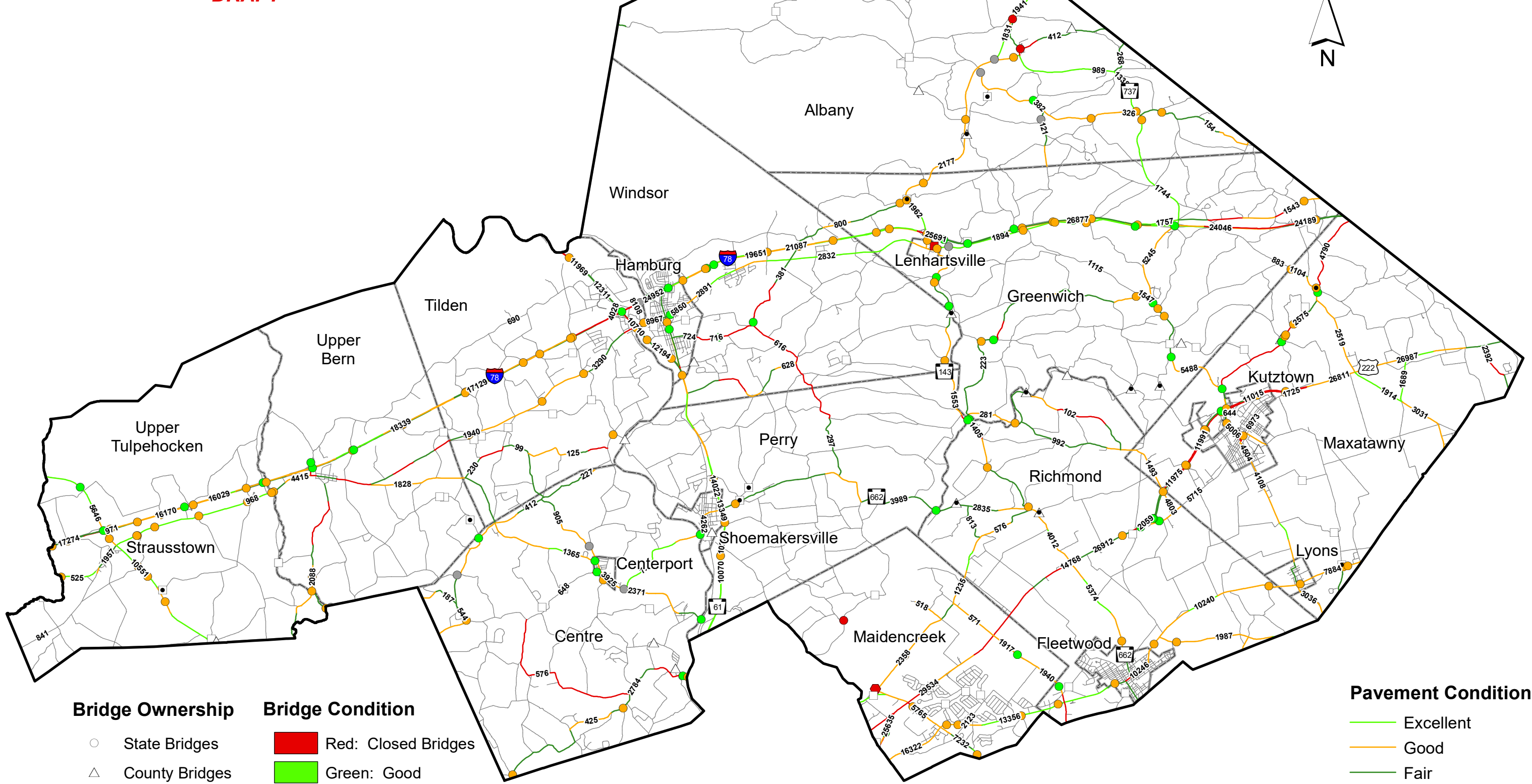
Source: Berks County Planning Commission GIS
Berks County Mapping, Berks County GIS, Berks County
DES, PennDOT
BAB 3/23





Hawk Mountain Region Composite Map

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Bridge Ownership

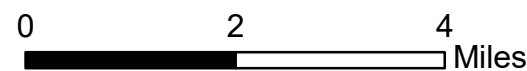
- State Bridges
- △ County Bridges
- Municipal Bridges
- ⬡ Other Bridges
- Posted Bridges

Bridge Condition

- Red: Closed Bridges
- Green: Good
- Orange: Fair
- Gray: Poor
- White: No Condition

Pavement Conditions

- Excellent
- Good
- Fair
- Poor
- 555 Traffic Volumes
- Municipal Boundaries



Source: Berks County Planning Commission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT BMS2 December 8, 2022, PennDOT August 10 2022
www.countyofberks.com/planning



Tulpehocken Region Composite Map

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Bridge Ownership

- State Bridges
- △ County Bridges
- Municipal Bridges
- ◇ Other Bridges
- Posted Bridges

Bridge Condition

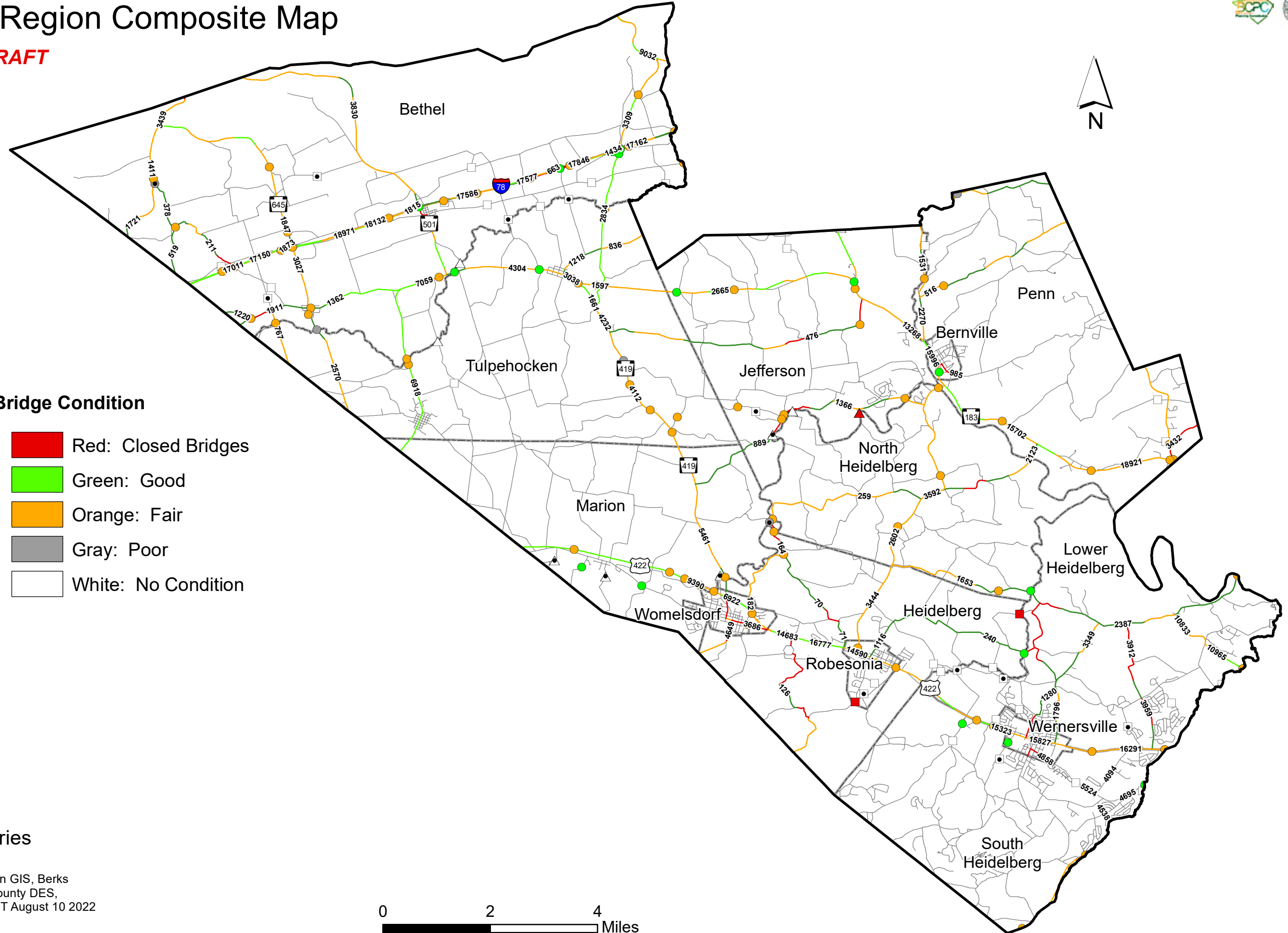
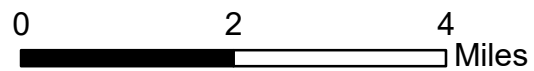
- Red: Closed Bridges
- Green: Good
- Orange: Fair
- Gray: Poor
- White: No Condition

Pavement Conditions

- Excellent
- Good
- Fair
- Poor
- 555 Traffic Volumes

Municipal Boundaries

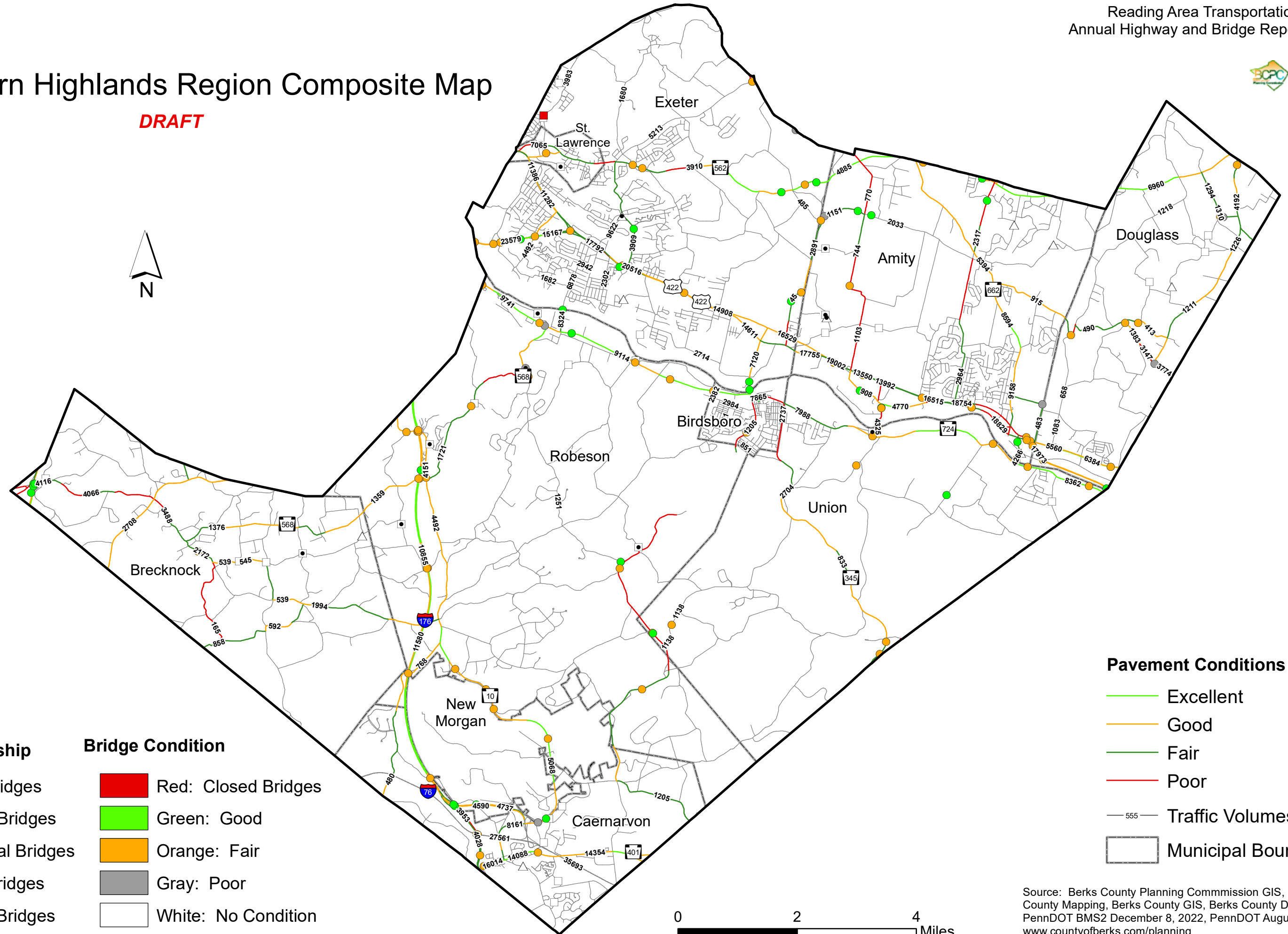
Source: Berks County Planning Commission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT BMS2 December 8, 2022, PennDOT August 10 2022
www.countyofberks.com/planning





Southern Highlands Region Composite Map

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Bridge Ownership

- State Bridges
- △ County Bridges
- Municipal Bridges
- ◇ Other Bridges
- Posted Bridges

Bridge Condition

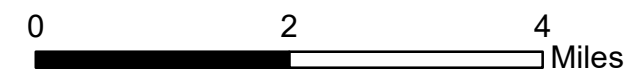
- Red: Closed Bridges
- Green: Good
- Orange: Fair
- Gray: Poor
- White: No Condition

Pavement Conditions

- Excellent
- Good
- Fair
- Poor

555 Traffic Volumes

Municipal Boundaries

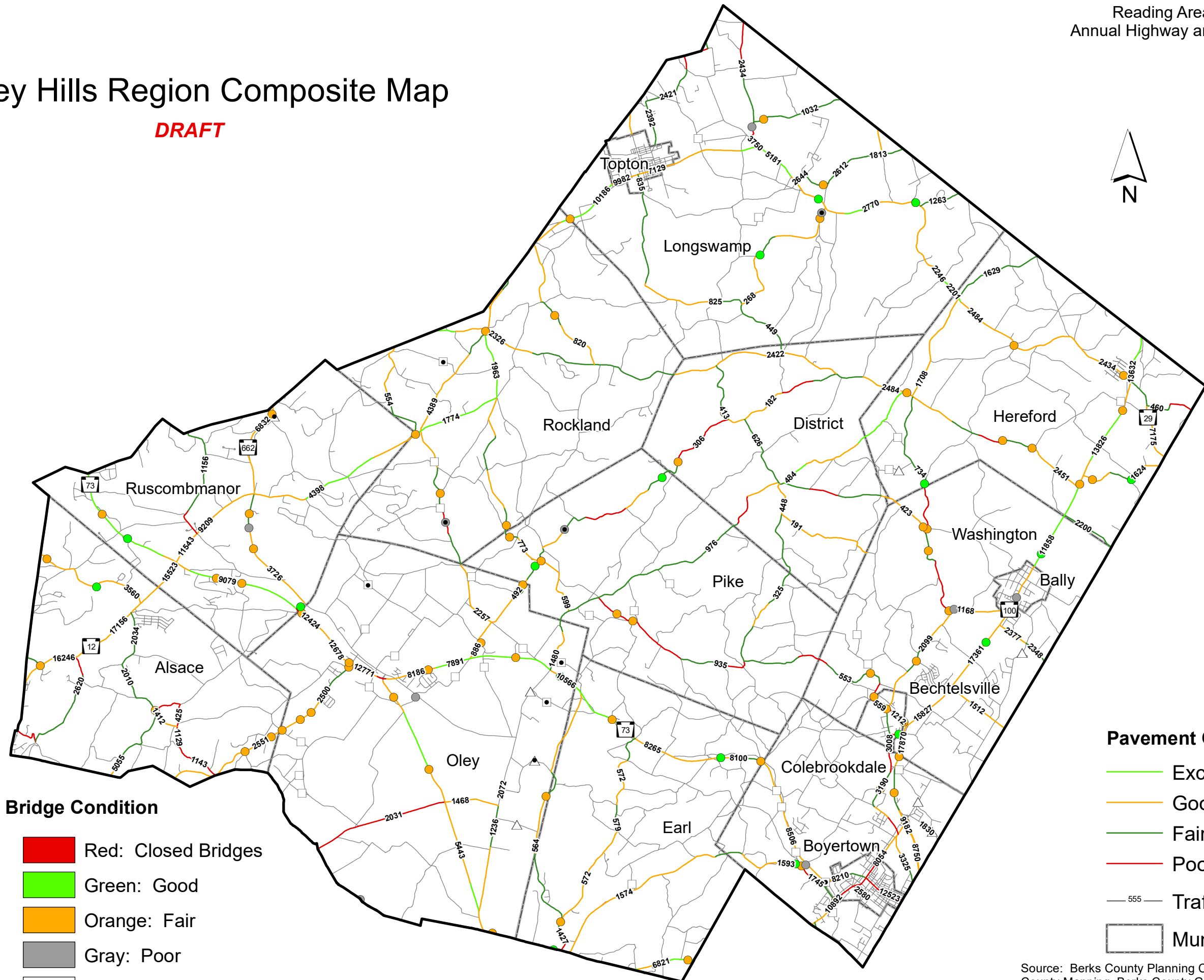


Source: Berks County Planning Commission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT BMS2 December 8, 2022, PennDOT August 10 2022
www.countyofberks.com/planning



Oley Hills Region Composite Map

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Bridge Ownership

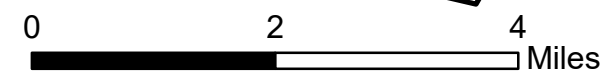
- State Bridges
- △ County Bridges
- Municipal Bridges
- ◇ Other Bridges
- Posted Bridges

Bridge Condition

- Red: Closed Bridges
- Green: Good
- Orange: Fair
- Gray: Poor
- White: No Condition

Pavement Conditions

- Excellent
- Good
- Fair
- Poor
- Traffic Volumes
- Municipal Boundaries



Source: Berks County Planning Commission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT BMS2 December 8, 2022, PennDOT August 10 2022
www.countyofberks.com/planning



Metro Region Composite Map

DRAFT



Bridge Ownership

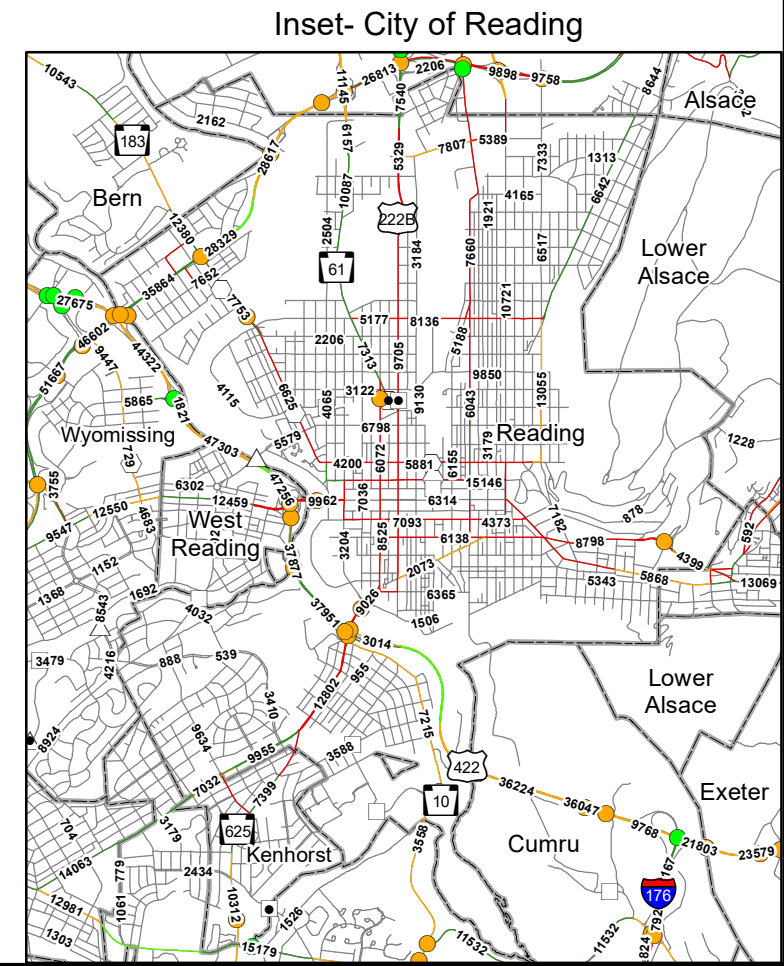
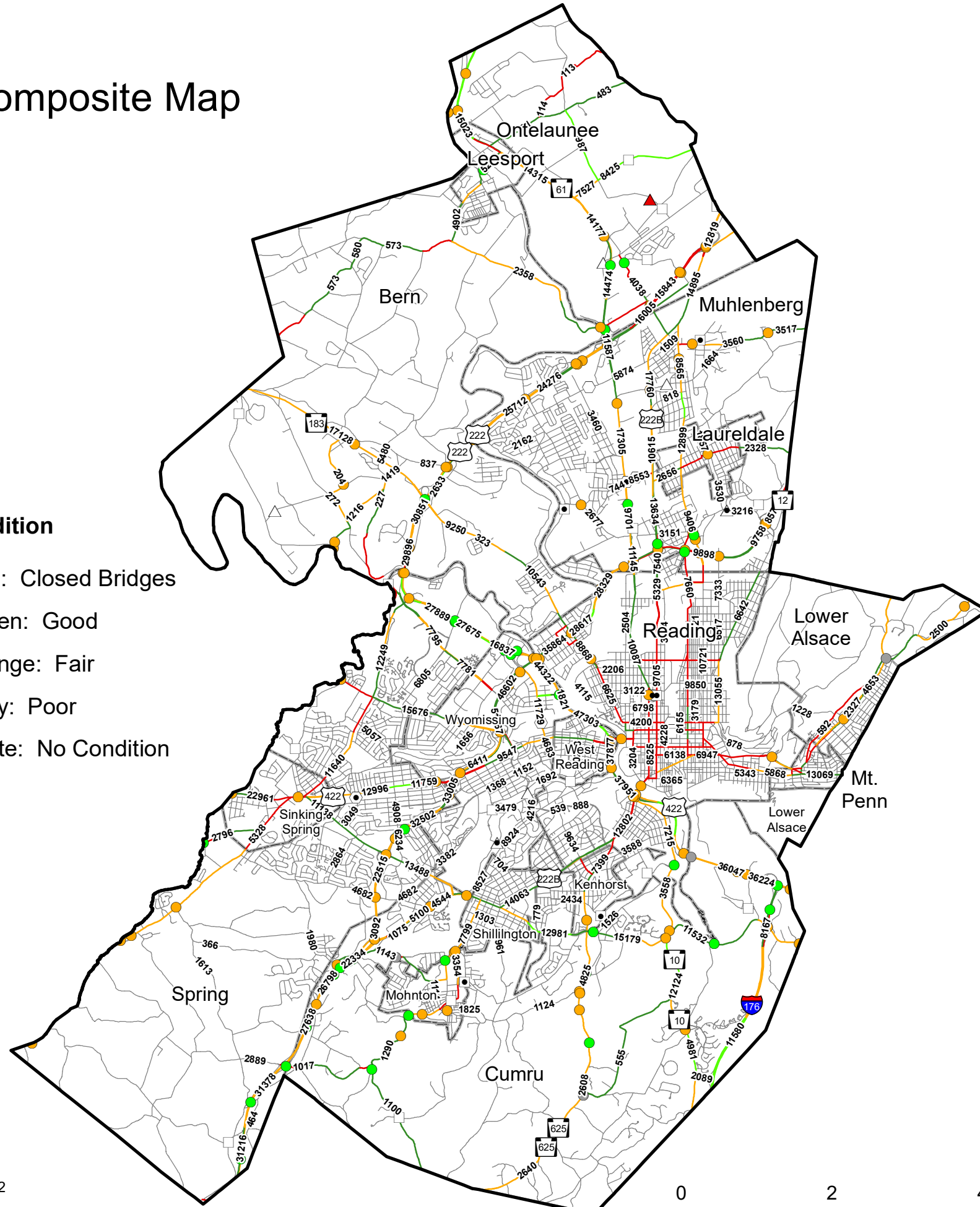
- State Bridges
- △ County Bridges
- Municipal Bridges
- ◇ Other Bridges
- Posted Bridges

Bridge Condition

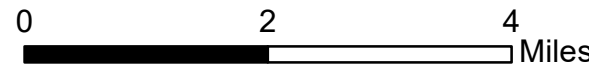
- Red: Closed Bridges
- Green: Good
- Orange: Fair
- Gray: Poor
- White: No Condition

Pavement Conditions

- Excellent
- Good
- Fair
- Poor
- 555 Traffic Volumes
- Municipal Boundaries



Source: Berks County Planning Commission GIS, Berks County Mapping, Berks County GIS, Berks County DES, PennDOT BMS2 December 8, 2022, PennDOT August 10 2022
www.countyofberks.com/planning



SECTION 5

PAVEMENT AND BRIDGE PROJECTS ON FFY 2023-2026 TRANSPORTATION IMPROVEMENT PROGRAM

Pavement Projects

As noted at the beginning of this document, RATS approves a Transportation Improvement Program (TIP) for the Metropolitan Area encompassing Berks County. The current FFY 2023-2026 TIP programs 131 projects totaling \$303,243,660 for phases over the four years of the program. Of those 131 projects, 105 projects address the highway and bridge system totally \$241,354,231. The following pavement projects on the NHS and other major routes were developed in cooperation between PennDOT and the Reading MPO :

MPMS #	PROJECT	DESCRIPTION AND LOCATION
89215	PA 12 West Resurface – 422 WB Ramps to SR 183	Project involves highway resurfacing of PA 12 (Warren Street Bypass) from US 422 WB ramps in Wyomissing Borough to PA 183 (Schuylkill Avenue) in the City of Reading. This project also involves driveway curb closures, guiderail and barrier upgrades, and pavement restriping to provide lengthened acceleration lanes.
96373	PA 61 Restoration – Phase 1	Project involves highway restoration of PA 61 from approximately 1700 feet south of Cabela’s Drive to the south end of the bridge over the Schuylkill River in Tilden Township.
10328	PA 61 Restoration – Phase 2A	Project involves highway restoration of PA 61 from 4th Street to the bridge over the Schuylkill River and State Street.
10867	PA 61 Restoration – Phase 2B	Project involves highway restoration of PA 61 from Zion’s Church Road in Perry Township through Windsor Township to the 4th Street intersection in Hamburg. The 4th Street intersection will be reconfigured.
110007	222 Warren Street - Wyomissing	Project involves concrete patching and ultra-thin overlay of US 222 from the Spring Township line near the Reading Boulevard overpass to a point between the State Hill Road and Paper Mill Road interchanges. The project also involves similar improvements to the ramps to US 422 Penn Avenue and State Hill Road.

While not specifically included in the Reading MPO TIP, two resurfacing projects to be carried out by PennDOT are included in the current Interstate TIP. These two projects extend along I-78 from the Midway exit in Bethel Township to Shartlesville and from Shartlesville to just west of PA 61.

Bridge Projects

Bridge projects appearing on the Reading MPO TIP and LRTP are developed in coordination with PennDOT. The Bridge Asset Management System (BAMS) is reviewed to identify candidate corridors and the required level of improvement. The bridge projects programmed in this TIP will make a major improvement to the MPO's overall bridge conditions.

The Reading MPO works closely with PennDOT to determine the most effective and efficient level of improvements to be implemented. In addition to those structures designated for major rehabilitation or replacement, the FFY 2023-2026 TIP contains four Bridge Preventative Maintenance packages, each containing several bridges, that are intended to provide repairs necessary to keep bridges currently designated as FAIR from becoming POOR. There are also two Bridge Overlay Bundles which look to extend the life of additional bridges by overlaying their decks. There are also two Box Culvert Bundles which address numerous smaller structures carrying highways over watercourses.

The following bridge projects on the NHS and other major routes were developed in cooperation between PennDOT and the Reading MPO :

MPMS #	PROJECT	DESCRIPTION AND LOCATION
109894	SR 61 Bridge Rehabilitation	Project involves the rehabilitation of the PA 61 bridge over the Schuylkill River and SR 4028 (West State Street) in the Borough of Hamburg and Tilden Township.
92070	US 422 (Penn Avenue) over Cacoosing Creek	Project involves the rehabilitation or replacement of US 422 over the Cacoosing Creek in Sinking Spring Borough.
10613	5th Street Bridge over NS RR	Project involves the rehabilitation or replacement of the Fifth Street (US 222-B) bridge over the Norfolk Sothern Railroad in the City of Reading.
93626	5th Street Bridge over PA 12	Project involves the rehabilitation or replacement of the Fifth Street (US 222-B) bridge over PA 12 in Muhlenberg Township.
91995	Centre Avenue over Norfolk Southern RR	Project involves the rehabilitation or replacement of the bridge carrying Centre Avenue (SR2087) over the Norfolk Southern Railroad in the City of Reading
91091	Schuylkill Avenue Bridge SB	Project involves a bridge replacement on Schuylkill Avenue (PA 183) southbound over the Norfolk Southern Railroad in the City of Reading.
91908	North Third Street over Tulpehocken Creek	Project involves the rehabilitation or replacement of the PA 419 (North Third Street) bridge over the Tulpehocken Creek in Marion and Heidelberg Townships.

The TIP also addresses 57 more specific bridge repair or rehabilitation projects on lower order roadways and repairs to a further 15 bridges included as elements of highway improvement projects. Most significantly, the TIP contains the Final Design phase for the proposed improvements to and reconstruction of the US 422 West Shore Bypass Phase 1, to be implemented in the LRTP beginning in FFY 2027. That project alone will replace seven large bridges with over 210,000 square feet of deck area and make repairs to three more with nearly 94,000 square feet of deck area. Subsequent phases of this reconstruction project will also include additional bridge upgrades.

While not specifically included in the Reading MPO TIP, Interstate improvements carried out by PennDOT are currently repairing or replacing bridges as an element of the reconstruction of I-78 from just east of Lenhartsville to the Lehigh County line and a major rehabilitation / widening of the bridge carrying I-78 over the Schuylkill River, Industrial Drive, the Blue Mountain and Northern Railroad, and Port Clinton Avenue is under way. This project also replaced the bridge carrying PA 61 over I-78. One additional project to replace and widen the I-78 bridge over PA 143 and the Maiden creek is included in the current Interstate TIP.

APPENDICES

2021 Performance Measures Annual Report – Pavements

Reading

* Change for 2021, MAP-21 miles expressed in lane miles.

Current MAP-21 Pavement Performance by Business Plan Network (Based on Total PA Lane Miles*)

Business Plan Network	MAP-21 Pavement Performance Measure										Missing (Max 5%)	
	Good				Fair		Poor				Lane Miles	%
	Lane Miles	%	2023 Target	2025 Target	Lane Miles	%	Lane Miles	%	2023 Target	2025 Target		
Interstate	108.6	59.73%	-	55%	73.0	40.13%	0.3	0.14%	-	2%	0.1	0.08%
NHS, Non-Interstate	130.6	31.31%	26%	18%	270.8	64.94%	15.6	3.75%	5%	6%	9.2	2.16%

- MAP-21 pavement performance measures required for FHWA reporting include four distress components which translate to good, fair, or poor condition scores. See table on reverse of this page for distresses and thresholds. Three conditions apply to each pavement type. A pavement 10th-mile section is considered in good condition if all three distress components are rated as good. A pavement 10th-mile section is considered in poor condition if two or more of its three distress components are rated as poor.
- FHWA requires that no more than 5 percent of a state's NHS Interstate lane-miles be in poor condition. Additionally, state DOTs are required to establish targets.
- FHWA has not established a minimum condition for NHS non-Interstate roadways, but requires the state DOT to establish targets.
- FHWA requires that no more than 5 percent of a state's mileage be unreported or missing.
- Conditions are assessed and analyzed for pavement "sections" that cannot exceed 0.10 miles in length, which differs from PennDOT's historic segment level data.
- MAP-21 performance measures apply to all Interstate and NHS Non-Interstate miles in PA, regardless of ownership. Therefore, PA Turnpike and local-owned miles are in Statewide totals, but not in each District's totals. Local-owned miles are included in MPO/RPO totals as appropriate.
- MAP-21 rulemaking requires that states develop and implement a risk-based asset management plan to achieve and sustain a state of good repair over the life cycle of transportation assets and to improve or preserve the condition of the NHS. Asset Management encompasses two related means of doing so: making infrastructure last as long as reasonably possible, and keeping up on preservation activities to minimize costlier major repairs. Together, these practices extend the life of assets and reduce the cost of maintaining them in the desired state of good repair. This is known as operating the network at the lowest life-cycle cost (LLCC).
- MAP-21 performance measures are not to drive planning and programming, but rather be an indication of performance achieved by states operating at the LLCC.

Current Pavement Smoothness (IRI) Summary by Business Plan Network (Based on PennDOT Segment Miles)

Business Plan Network	Excellent		Good		Fair		Poor		Median IRI	Tested Seg-Mi
	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%		
Interstate	24.8	26.60%	39.8	42.68%	20.4	21.85%	8.3	8.87%	83	93.3
NHS, Non-Interstate	28.3	13.80%	83.1	40.55%	57.8	28.21%	35.7	17.45%	114	204.9
Non-NHS, ≥ 2000 ADT	60.5	16.97%	185.4	51.97%	71.5	20.05%	39.3	11.02%	128	356.7
Non-NHS, < 2000 ADT	26.7	7.91%	120.1	35.60%	132.8	39.38%	57.7	17.11%	175	337.2
Total - Roadway	140.3	14.14%	428.3	43.17%	282.5	28.47%	141.0	14.21%	140	992.1

Current Overall Pavement Index (OPI) Summary by Business Plan Network (Based on PennDOT Segment Miles)

Business Plan Network	Excellent		Good		Fair		Poor		Median OPI
	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%	Seg-Mi	%	
Interstate	4.2	5.11%	65.2	80.16%	11.0	13.50%	1.0	1.23%	92
NHS, Non-Interstate	11.9	5.84%	141.1	69.20%	40.5	19.85%	10.4	5.12%	85
Non-NHS, ≥ 2000 ADT	52.7	14.82%	210.0	59.02%	80.9	22.74%	12.2	3.42%	85
Non-NHS, < 2000 ADT	86.2	25.59%	218.1	64.71%	29.4	8.77%	3.3	0.98%	81
Total - Roadway	155.0	15.85%	634.3	64.86%	161.7	16.54%	26.9	2.75%	84

Total Miles

PennDOT Seg-Mi	PA Lane Miles
93.3	182.0
208.2	426.2
360.9	
339.2	
1,001.7	

- The IRI and OPI data presented herein is segment level.
- For the Interstate and NHS, Non-Interstate Business Plan Networks, the IRI and OPI data is for 2021. For the Non-NHS Business Plan Networks, the IRI and OPI data for most recent year captured, either 2020 or 2021.
- PennDOT has historically classified Good Interstate IRI as ≤100, and Poor Interstate IRI as >150; for NHS Non-Interstate, Good is ≤120 and Poor is >170. This practice is maintained in the IRI data presented herein, but differs from the MAP-21 definitions defined in the table on the reverse of this page.

Current Out-Of-Cycle (OOC) Assessment by Business Plan Network (Based on PennDOT Segment Miles)

Business Plan Network	High Level Bituminous		Low Level Bituminous				Concrete			Potentially Past DSL Seg-Mi	
	Seg-Mi	OOC Mi ²	Seg-Mi	OOC Mi ²	OOC Mi ²	Total	Seg-Mi	OOC Mi ²	OOC Mi ²		Total
Interstate	76.89	5.15	0.00	0.00	0.00	0.00	16.44	4.48	4.44	4.48	5.23
NHS, Non-Interstate	176.11	56.85	0.00	0.00	0.00	0.00	62.16	33.57	30.23	33.57	105.73
Non-NHS, ≥ 2000 ADT	201.54	106.70	169.42	17.21	25.52	17.21	2.29	2.24	2.24	2.24	
Non-NHS, < 2000 ADT	3.86	1.10	322.84	16.03	61.64	16.03	0.00	0.00	0.00	0.00	
Total - Roadway	458.40	169.79	492.25	33.24	87.15	33.24	80.89	40.30	36.91	40.30	

- Out-Of-Cycle Categories:
 - High Level Bituminous Pavement with Age > 12 Years or > 17 Years with Interim Surface Seal
 - Low Level Bituminous Surface with Age > 7 Years
 - Low Level Bituminous Pavement with Age > 20 Years or no Structural Layers
 - Concrete Pavements with Age > 30 Years
 - Concrete Pavements with Age > 20 Years and No Concrete Pavement Restoration (CPR)
- Total Low Level OOC represents the miles that are OOC for either Category 2 or 3. Segments that are OOC for both categories are not double counted.
- Total Concrete OOC represents the miles that are OOC for either Category 4 or 5. Segments that are OOC for both categories are not double counted.
- Pavement Potentially Past Design Service Life is defined a pavement structure age greater than 40 years, and OOC according to any of the categories. This indicates that, even though the surface is OOC, the pavement may be in need of more than resurfacing or CPR due to its overall age.

2018-MPO/RPO, 8/10/2022

MAP-21 Bridge Performance by Business Plan Network (Based on all NHS Bridge Owners Greater than or Equal to 20' in Length)

Business Plan Network	MAP-21 Bridge Performance Measure											
	Good				Fair				Poor			
	Count	Count %	Deck Area (Msf)	Deck Area %	Count	Count %	Deck Area (Msf)	Deck Area %	Count	Count %	Deck Area (Msf)	Deck Area %
Interstate	5	11.90%	0.054	13.29%	33	78.57%	0.216	53.44%	4	9.52%	0.134	33.27%
NHS, Non-Interstate	15	12.40%	0.086	5.96%	100	82.64%	1.238	86.00%	5	4.13%	0.104	7.23%
Total NHS	20	12.27%	0.139	7.57%	133	81.60%	1.453	78.87%	9	5.52%	0.238	12.93%

Total NHS Deck Area Poor %	Map-21 Goal	End of Year 2021 Value	2021 Target	2023 Target	2025 Target
	10.00%	12.93%	16.00%	14.00%	13.00%

Business Plan Network	Count	Deck Area (Msf)
Interstate	42	0.404
NHS, Non-Interstate	121	1.439
Total NHS	163	1.843

- MAP-21 bridge data is assessed and analyzed by National Bridge Inventory Standards (Bridges 20' and greater), which differs from PennDOT's 8' and greater reporting.
- MAP-21 performance measures apply to all Interstate and NHS Non-Interstate bridges in PA, regardless of ownership. Therefore, PA Turnpike and local-owned bridges are included in totals.

- MAP-21 bridge performance measures required for FHWA reporting include good, fair, or poor condition scores for each bridge. A bridge is considered to be in good condition if the minimum condition rating of the deck, superstructure, substructure, or culvert ratings is 9, 8, or 7, fair if the minimum condition rating is 6 or 5, and poor if the minimum condition rating is 4 or less.
- FHWA requires that no more than 10 percent of a state's total NHS Bridge Deck Area be in poor condition. Additionally, state DOTs are required to establish biennial targets for poor deck area.
- FHWA has not established a minimum condition for Interstate only bridges or NHS non-Interstate bridges, but requires the state DOT to establish targets.
- FHWA requires that no more than 5 percent of a state's bridge data be unreported or missing.
- MAP-21 rulemaking requires that states develop and implement a risk-based asset management plan to achieve and sustain a state of good repair over the life cycle of the asset to improve or preserve the condition of the NHS. Asset Management encompasses two related means of doing so: making infrastructure last as long as reasonably possible through keeping up on preservation activities to minimize costlier major repairs, and utilizing a structure for its entire service life. These practices allow the department to operate to lowest life cycle cost (LLCC) on the network level.
- MAP-21 performance measures are not to explicitly drive planning and programming, but rather be an indication of performance achieved by states operating at the LLCC.

Business Plan Network	Total Bridge Count	Total Deck Area (Msf)	Aver. Bridge DA (sf)	Closed Bridges	Posted Bridges	Poor Count	% Poor by Count	Poor-Deck Area (Msf)	% Poor by Deck Area	Non-Poor Bridges with a "5" Condition Rating
State >8': Interstate/Ramps	64	0.3814	5,959	0	2	4	6.25%	0.1343	35.21%	20
State >8': NHS (non-Interstate)	151	1.4622	9,684	0	1	6	3.97%	0.1047	7.16%	55
State >8': non-NHS > 2000 ADT	236	0.7001	2,967	0	2	13	5.51%	0.0305	4.36%	90
State >8': non-NHS < 2000 ADT	194	0.3855	1,987	2	10	21	10.82%	0.0304	7.89%	82
Total - State Bridges (>8')	645	2.9292	4,541	2	15	44	6.82%	0.2999	10.24%	247
Local >20'	236	0.4552	1,929	6	60	71	30.08%	0.1301	28.58%	76

Reducing Rate of Deterioration through Investment (Non-Replacement) (Based on 8' and greater)

Business Plan Network	Annual New Poor Count (Poor "on")	Annual New Poor Count (Poor "off")	Annual New Poor DA (Poor "on")	Annual New Poor DA (Poor "off")	Preservation (million\$)	Preservation (#bridges)
State >8': Interstate/Ramps	0	0	0.00%	0.00%	\$0.00	0
State >8': NHS (non-Interstate)	0	0	0.00%	0.00%	\$0.00	0
State >8': non-NHS > 2000 ADT	0	4	0.23%	1.63%	\$0.00	0
State >8': non-NHS < 2000 ADT	2	6	0.41%	1.71%	\$0.00	0
Total - State Bridges (>8')	2	10	0.11%	0.61%	\$0.00	0
Local >20'	1	1	0.43%	1.10%	\$0.00	0

Reading Area Transportation Study January, 2023

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City of Reading	Mr. Timothy Krall, Department of Public Works
South Central Transit Authority /	Mr. Keith Boatman, Assoc. Director of Capital Projects/Planning
Berks Area Regional Transportation Authority	Ms. Lauri Ahlskog, Manager of Transit Planning & Compliance*
Reading Regional Airport Authority	Mr. Zackary Tempesco, Airport Manager

* denotes alternate



READING AREA TRANSPORTATION STUDY

**ANNUAL
PAVEMENT
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CONDITION
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