Congestion Management Process

RATS updated the Congestion Management Process (CMP) in November 2025 and this LRTP will include the CMP by reference. Development and maintenance of a CMP is a requirement for all MPOs in Transportation Management Areas (TMAs) under federal law. A CMP has great benefit - it provides a systematic and continuous method to pinpoint roadway congestion and to help identify improvements that alleviate it.

The CMP and the included CMP Network addresses the multimodal transportation network, consistent with federal guidelines. The CMP Network was defined by analyzing criteria outlined below which reflect travel times, traffic volumes and speed, and non-recurring factors (crashes), which are sources of congestion that can occur at any time.

The Expanded National Highway System (NHS) serves as the base for the CMP Network. These higher-order roadways (interstates, expressways, principal arterials) serve to move large volumes of traffic over longer distances, while still providing for local and regional travel. Congestion and crashes on the NHS have the potential to disrupt large amounts of regional and long-distance traffic and freight movement. Crashes on limited-access expressways and interstates can result in long delays due to limited exit points and few detour routes. Arterials move regional and local traffic as well, and may have higher volumes, concentrated access points, traffic signals and other factors that contribute to longer delays.

High Volume/Capacity (V/C) Segments show that a road's capacity is approaching (or has approached) the maximum number of vehicles it can carry. Volume-to-Capacity (V/C) ratios examine the number of vehicles on the road in a given period (usually one hour) versus that roadway's physical capacity. When the V/C ratio reaches 1.00, physical capacity has been reached, and congestion begins. V/C ratios greater than 1.00 show worsening congestion. Basically, the higher the V/C ratio, the more congestion on a particular road segment.

Travel Time Index (TTI) is a measure derived from INRIX (International Roadway and Traffic Information Exchange) Road Analytics software XD travel time data and is defined as the ratio of the peak period average travel time to the free-flow travel time (uncongested travel time) for a given roadway segment. Free-flow values were determined for this, and all other INRIX based measures, using reference speeds provided by INRIX for each road segment based on 85th percentile observed speeds for all time periods. The greater the TTI value, the more congestion it indicates. A TTI of 1.00 indicated vehicles are traveling at free-flow speeds, while one at 1.50 indicates a 20-minute free-flow trip takes 30 minutes. Roadways with a TTI between 1.20 and 1.50 are considered moderately congested, and ones greater than 1.50 are considered highly congested. For the CMP, staff analyzed the data for weekdays during peak hours 7:00AM – 9:00AM and 4:00PM – 6:00PM.

Planning Time Index (PTI) is a measure also derived from the INRIX XD travel time data but is defined as the ratio of the peak period 95th percent travel time to the free-flow travel time for a given road segment. The 95th percentile indicates that 95 percent of the travel times are less, and 5 percent more, and measures the variability of reliability of travel. A PTI of 1.00 means the trip time is consistently the same from day to day, while higher values mean more variation and congestion. A PTI of 3.00 indicates a 20-minute free-flow trip will take 60 minutes in the peak period, which is equivalent to one workday a month, where one might expect to leave 40 minutes earlier to arrive on time. Roadways with a PTI between 2.00 and 3.00 are considered moderately unreliable and ones greater than 3.00 are considered highly unreliable. For the CMP, staff analyzed the data for weekdays during peak hours 7:00AM – 9:00AM and 4:00PM – 6:00PM.

High Crash Corridors derived from PennDOT's Pennsylvania Crash Information Tool (PCIT) are used to identify corridors that have high frequency of reportable crashes. Since congestion can cause accidents and accidents can cause congestion, these high crash corridors were included in the network selection process.

Freight and Intermodal Corridors were derived from PennDOT's 2045 Freight Movement Plan (PUB 791 (05-23)). Utilizing the Federal Highway Administration's (FHWA) established National Highway Freight Network (NHFN) PennDOT developed the statewide plan to examine trends and issues associated with freight throughout the Commonwealth. The NHFN includes the following subsystems of roadways:

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. As of the 2022 Congressional re-designation of the PHFS, this network consists of about 41,799 centerlines miles, including 38,014 centerline miles of Interstate and 3,785 centerline miles of non-Interstate roads.
- **Other Interstate portions not on the PHFS (non-PHFS):** These highways consist of the remaining portion of Interstate roads not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 10,265 centerline miles of Interstate nationwide and will fluctuate with additions and deletions to the Interstate Highway System. The mileage for Non-PHFS Interstate is based on the Interstate Mileage reported in the National Highway System (NHS) as of October 17, 2019.
- **Critical Rural Freight Corridors (CRFCs):** These are public roads not in an urbanized area which provide access and connection to the PHFS and the Interstate with other important ports, public transportation facilities, or other intermodal freight facilities. As of January 2023, there are about 5,390 centerline miles designated as CRFCs.
- **Critical Urban Freight Corridors (CUFCs):** These are public roads in urbanized areas which provide access and connection to the PHFS and the Interstate with other ports, public transportation facilities, or other intermodal transportation facilities. As of January 2023, there were about 2,656 centerline miles designated as CUFCs.

In Berks County the PHFS consists of Interstate 78, Interstate 176, US 222 South and US 422. The County has no non-PHFS designated roadways. PA 61 is designated as a CUFC and U.S. 222 North is considered a CRFC. For purposes of our CMP we identify each corridor as critical.

Bottlenecks are specific physical locations on roadways that routinely and predictably experience congestion because the traffic volumes exceed highway capacity. Surge demand higher than can be accommodated by base capacity brings about bottleneck congestion. Bottlenecks are characterized by queues upstream and freely flowing traffic downstream.

Bottlenecks may be compared to a storm pipe that can carry only so much water – during floods the excess water just backs up behind it, much the same as traffic at bottleneck locations. However, the situation is even worse for traffic. Once the traffic flow breaks down to stop-and-go conditions, capacity is actually reduced – fewer cars can get through the bottle neck because of the extra turbulence.

Using the INRIX Roadway Analytics software RATS staff was able to identify the top bottleneck areas in Berks County for 2024 based on the *Total Delay* encountered at that particular site. The *Total Delay* is the speed differential factor, weighted by the volume estimate, considers raw speed drop, weighted by queue lengths for each time interval and queue length.

Transit Routes show BARTA's fixed-route, scheduled bus transit services in Berks County. Current BARTA fixed-route transit service was examined as part of the network building process. In FFY 2024-2025, BARTA provided 2,163,706 trips on its system of 22 fixed routes. Of those trips, approximately 59 percent were for work purposes, 36 percent were for shopping, and the remaining 5 percent were for personal business, school, medical, social, and other purposes.

The CMP Network is divided into a series of 33 corridors. Each corridor is assessed in detail within the CMP. The most congested corridors in Berks County are shown on the following table and on Maps 33, 34 and 35. These corridors were ranked using both the peak Travel Time Index (TTI) and the Average Annual Daily Trips (AADT) in that corridor for the year 2024. Please note that these rankings are not a definitive account of congestion along the network or a representation of prioritizing one corridor over another for improvements. Rather, it is an introduction to useful data and highlights the bottlenecks and most congested segments in Berks County. Three corridors are defined as Highly Congested (red) and an additional 19 corridors are defined as Moderately Congested (yellow).

Most Congested Corridors Ranked by Travel Time and Daily Traffic			
Rank	**Corridor**	**Average TTI***	**Max AADT**
1	**SR 3023 (State Hill Road)**	**1.67**	**23,706**
2	**PA 724 (Sinking Spring to U.S. 222 Business)**	**1.59**	**17,930**
3	**U.S. 222 Business (U.S. 422 West Shore Bypass to PA 12)**	**1.55**	**21,854**
4	**U.S. 222 Business (PA 12 to U.S. 222 Merge)**	**1.48**	**31,531**
5	**PA 73 (Oley Area)**	**1.48**	**18,495**
6	**U.S. 422 Business (Penn Street Bridge to U.S. 422 Merge)**	**1.44**	**51,157**
7	**PA 61 (PA 12 to U.S. 222)**	**1.38**	**29,010**
8	**U.S. 422 Business (U.S. 222 Merge to U.S. 422 Interchange)**	**1.36**	**27,173**
9	**U.S. 222 Business (U.S. 222 Merge to U.S. 422 West Shore Bypass)**	**1.35**	**24,807**
10	**PA 183 (Washington Street to U.S. 222)**	**1.34**	**31,863**
11	PA 345 (PA 724 to U.S. 422)	1.33	9,630
12	PA 562 and SR 2067	1.32	18,102
13	PA 10	1.32	7,765
14	SR 1010	1.30	14,184
15	PA 401	1.30	6,419
16	PA 724 (U.S. 222 Business to Interstate 176)	1.29	19,005
17	SR 3021 (Paper Mill Road)	1.29	16,170
18	PA 61 (U.S. 222 Business to PA 12)	1.27	19,640
19	PA 73 (Boyertown Area)	1.27	10,839
20	U.S. 222 (U.S. 222 Business Merge to Lehigh County)	1.25	47,719
21	PA 23	1.23	14,197
22	PA 724 (Interstate 176 to Birdsboro)	1.21	10,608
23	U.S. 422 (West Shore Bypass to Montgomery County)	1.19	35,671
24	PA 61 (U.S. 222 to Schuylkill County)	1.19	29,946
25	SR 3055 (Van Reed Road)	1.18	11,655
26	U.S. 422 (Lebanon County to U.S. 222 Merge)	1.16	43,730
27	PA 183 (US 222 to Schuylkill County)	1.11	31,813
28	PA 100	1.08	24,803
29	SR 2089	1.06	3,810
30	PA 29	1.04	12,899
31	PA 12 (Pricetown Road)	1.03	27,433
32	U.S. 422 (West Shore Bypass)	0.98	84,788
33	Interstate 78	0.97	38,366
34	PA 12 (Warren Street Bypass)	0.94	80,393
35	Interstate 176	0.94	16,749
36	U.S. 222 (Lancaster County to U.S. 422 Merge)	0.88	51,071
37	U.S. 222 (U.S. 422 Merge to U.S. 222 Business Merge)	0.82	113,173